Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

July, 1934

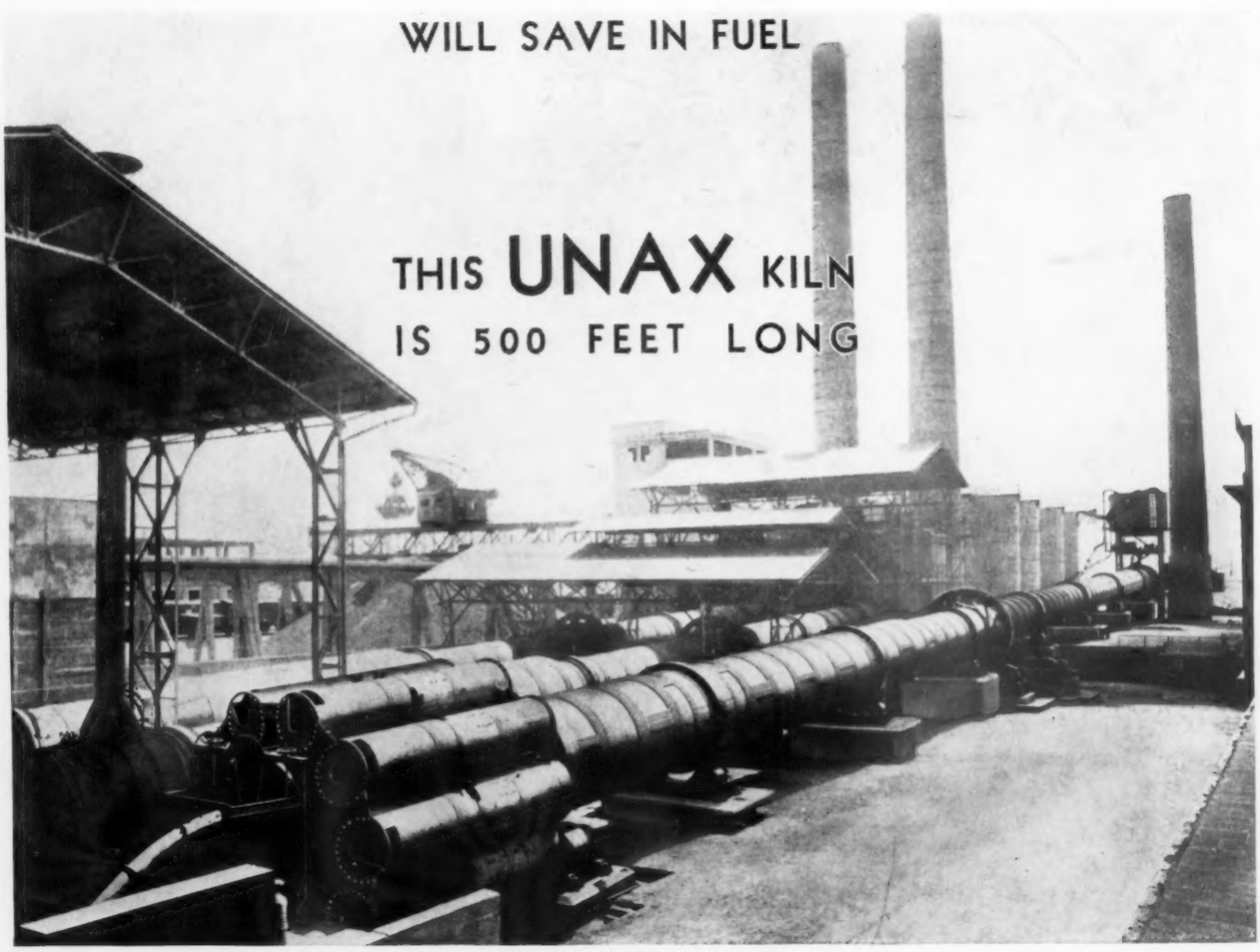
NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

JUL 25 1934

MODERN ROTARY KILNS

WILL SAVE IN FUEL

THIS **UNAX** KILN
IS 500 FEET LONG



F. L. SMIDTH & CO.

225 BROADWAY NEW YORK, N. Y.

1929 the largest net paid A. B. C. producer circulation in the field

TN1
.P65

LOOK

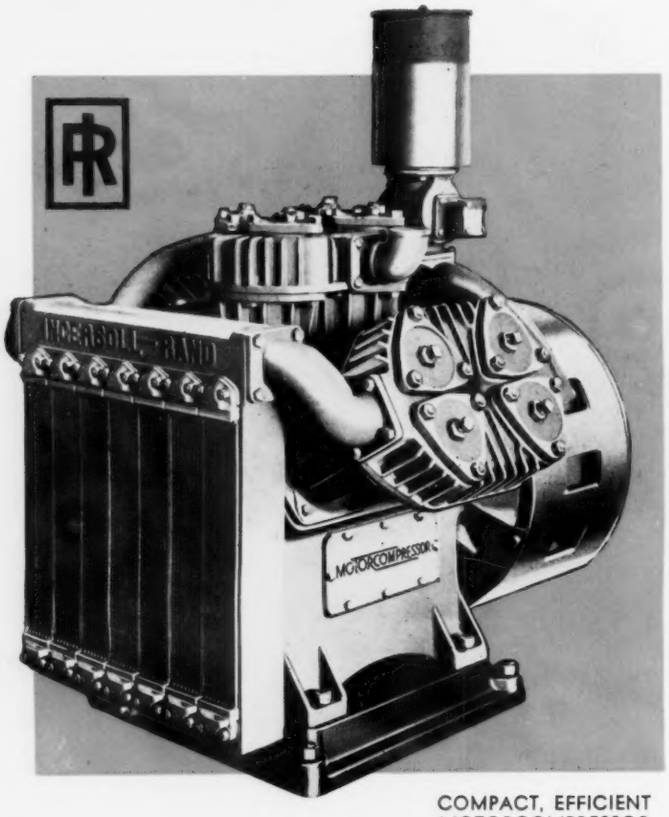
NO FURTHER

You have been looking for a compact compressor unit with "lots of power packed into small space" and here it is—the I-R Two-Stage, Air-Cooled MOTORCOMPRESSOR with "Built-in" Electric Motor.

What a unit!—combining efficiency in operation and refinements in design, which only time and experience could bring—a real achievement of I-R engineers.

The MOTORCOMPRESSOR proves up on the job! It delivers 23% more air and shows a 15% power saving. It is air-cooled—no water—no freezing. The temperature is kept low by the two-stage compression principle, eliminating carbon and valve troubles. It is easy to install—just bolt it down anywhere. It runs quietly and vibrationless, with sustained high efficiency.

MOTORCOMPRESSORS are furnished in sizes for 100 pounds discharge pressure ranging from 20 to 50 hp. Write for bulletin describing the many advanced features.



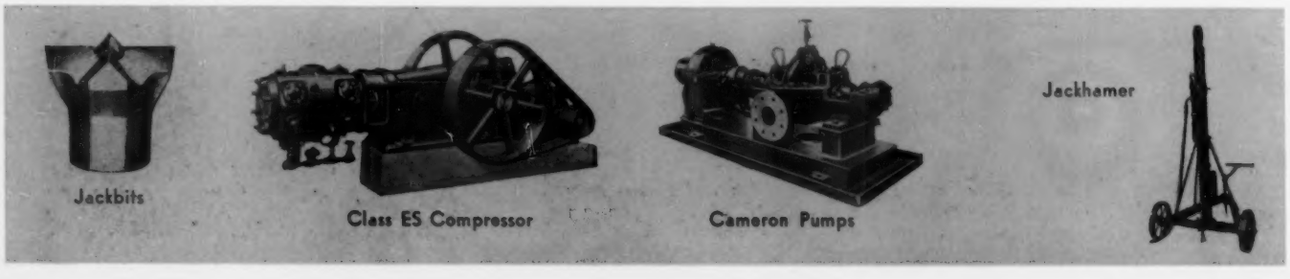
COMPACT, EFFICIENT
MOTORCOMPRESSOR
Two-Stage, Air-Cooled
Stationary Air Compressor
With Integral Motor

ATLANTA
BIRMINGHAM
BOSTON
BUFFALO
BUTTE
CHICAGO
CLEVELAND
DALLAS
DETROIT
DENVER
DULUTH
EL PASO
HONOLULU
HOUSTON
KNOXVILLE
LOS ANGELES

Ingersoll-Rand

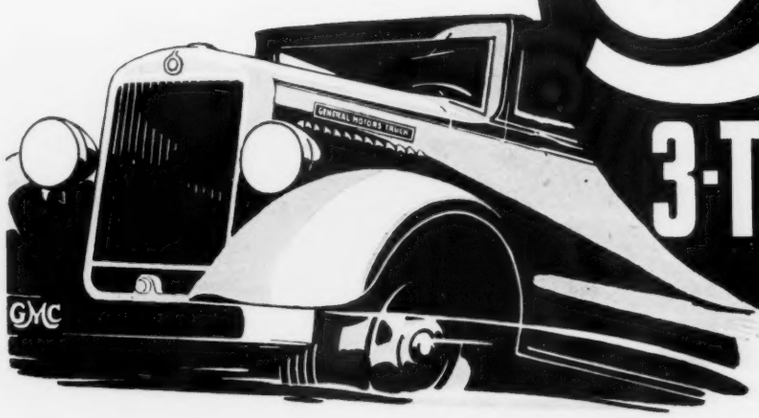
11 BROADWAY, NEW YORK CITY

MANILA
NEWARK
NEW YORK
PHILADELPHIA
PICHER
PITTSBURGH
POTTSVILLE
SAN FRANCISCO
SALT LAKE CITY
SCRANTON
SEATTLE
ST. LOUIS
ST. PAUL
TULSA
WASHINGTON



TRUCK NEWS!

A NEW GMC 3-TON TRUCK



An Outstanding Value

Any 3-ton truck priced at only $925 would ordinarily be considered a real value. But here is a 3-ton truck bearing the GMC name, a truck with every feature that insures truck-built performance, economy and dependability—and priced at only $925. Such a truck value is truly outstanding.

Listed at the right are a few of the many modern improvements found in this newest addition to the GMC line. They combine to produce not only a unit of unusual ability in its capacity range, but also a unit fully comparable with many so-called heavier duty trucks. *Write for details today.*

$925

CHASSIS F. O. B. PONTIAC

Gross Rating—12,500 Lbs.

Payload Capacity—2½-3½ Tons

Wheelbases—142"—166"—184"

GMC Valve-in-Head Engine
69 H.P. 155 Ft. Lbs. Torque

Frame 8" Deep

Centrifuse Brake Drums

Needle-Bearing Universal Joints

Maximum Tire Size
8.25/20 10-ply Duals

Full Floating Rear Axle

GENERAL MOTORS TRUCKS AND TRAILERS
GENERAL MOTORS TRUCK COMPANY PONTIAC, MICHIGAN
Time Payments Available Through Our Own Y. M. A. C.

©C1B 240355 OCT 19 1934

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 27 July, 1934 Number 1

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.

Copyright 1934 by
COMPLETE SERVICE PUBLISHING CO.
538 South Clark St.
Chicago, Ill.

H. W. BAUMGARTNER
President

S. A. PHILLIPS
Vice-President and Directing Editor

Field Editor:
W. E. TRAUFFER

News Editor:
C. M. HANCOCK

Production:
W. T. KLUSSMAN

Advertising Manager:
JAMES E. MONTGOMERY
Telephone *HARrison 9357*
Chicago, Ill.

Eastern Advertising Manager:
E. M. BUCK
98 North Chatsworth Ave.,
Larchmont, N. Y.

Central Advertising Manager:
W. E. COATES
1233 St. Charles Ave.
Telephone *LAkewood 1479J*
Lakewood, Ohio

Western Advertising Manager:
W. A. BUSCHMAN
Telephone *HARrison 9357*
Chicago, Ill.

Advertising Representative:
IVER W. LEE, 122 E. 7th St.
Los Angeles, Cal.

Subscription price: $2 for 3 years, $1 for 1 year in the United States and possessions, Central, and South America; elsewhere (including Canada) $1 additional for each year. Single copies 20 cents.

In This Issue

News of the Industry 21

Editorials 26

Trend Toward Special Cements Shown at A. S. T. M. Atlantic City Meeting 28

Recuperators on Cement Kilns Reduce Fuel Rate and Increase Capacity 29

The Nonmetallic Minerals of California—II . 33

P. W. A. in Its First Half-Year Spends $6,781,992 for Nonmetallics 37

Cement Industry's Only New Plant Nears Completion in Lehigh Valley 39

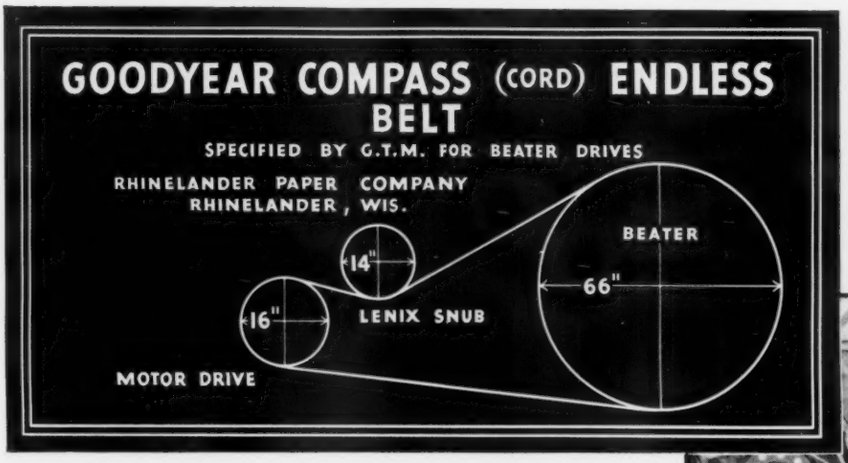
Standard and Special Cements Can Be Made of Inferior Materials 41

Cement-Plant Quarry Also Supplies New Commercial Stone-Crushing Plant . . . 43

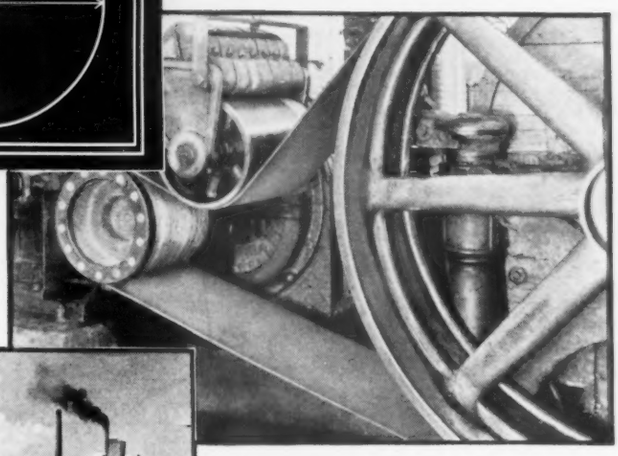
Men of the Industry 45
Personal Mention 46
New Corporations 46
Aggregates Statistics 47
Latest Cement Statistics . 49
Labor Conditions 50
Traffic 52
Foreign Developments 53
Recent Patents 54
New Machinery and Supplies . 55

NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

DOUBLE BEST FORMER RECORD

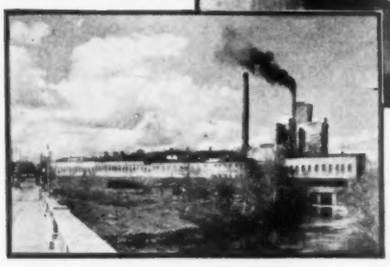


G.T.M.-SPECIFIED BELTS WIN "SHOW DOWN" ON BUSY PAPER MILL'S BEATER DRIVES



Goodyear COMPASS (Cord) Endless Belt on Lenix Drive, Rhinelander Paper Company

Have run continuously more than 3 years; previous belts averaged only 19 months!



FEW, if any, industrial jobs are harder on belts than paper mill beater drives — especially in a plant like the Rhinelander Paper Company, Rhinelander, Wisconsin, that has been operating at capacity all through the depression to supply the demand for their famous grease-proof glazed and waxed papers.

In 1931, the Rhinelander people became "fed up" with belt troubles—stretching and other difficulties that were interrupting production. They put it up to the G.T.M.—Goodyear Technical Man.

G.T.M. RECOMMENDS COMPASS *(CORD)* ENDLESS

After carefully checking operating conditions with Mr. George H. Suhs, Plant Engineer of the company, the G.T.M. specified Goodyear COMPASS *(Cord)* Endless Belts, 25′ long by 20″ wide, for the battery of large 2,000-pound capacity Jones-Horne Beaters.

Let Mr. Suhs tell you the results. He writes:

"Formerly the average maximum life of our belts was only 19 months. Today, a number of your COMPASS Belts have been running continuously for more than three years — many more than two years — without stretching or stoppage for repairs!"

Longer service—fewer replacements! Trouble-free operation—no expensive delays! That has been the record in thousands of plants where belts and other Goodyear Mechanical Rubber Goods have been individually specified to the job by the G.T.M. His practical experience is at your disposal—just write Goodyear, Akron, Ohio, or Los Angeles, California—or your nearest Goodyear Mechanical Rubber Goods Distributor.

BELTS • MOLDED GOODS
HOSE • PACKING
MADE BY THE MAKERS OF GOODYEAR TIRES

THE GREATEST NAME IN RUBBER

NRA CODE

GOODYEAR

Build Reliability into Your Equipment

. . CHAINS . .

"C" Class Combination Chain

"800" Class Ley Bushed Chain

"SS" Class Steel Conveyor Chain

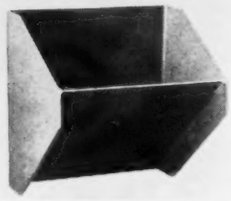
SPROCKETS—GEARS

20,000 Sprockets in Stock

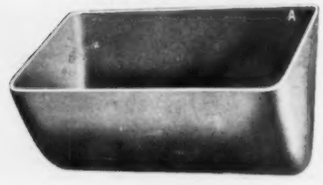
Gears of All Types

Herringbone Gears

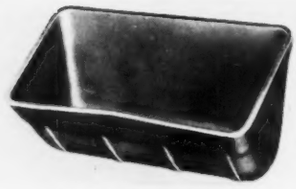
. . BUCKETS . .



Steel Elevator Buckets



Malleable Iron Buckets

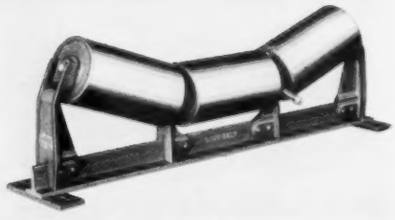


"AAP" Promal Bucket

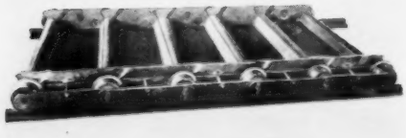
CONVEYOR ELEMENTS

Caldwell Conveyor

Standard Steel Apron Conveyor

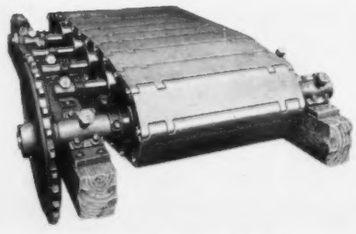


Type "70" Belt Conveyor Idler



Steel Pan Apron Conveyor

Type "40" Belt Conveyor Idler

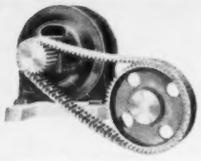


Steel Apron Feeder

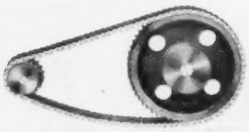
LINK-BELT

With LINK-BELT Replacement Parts

POSITIVE DRIVES

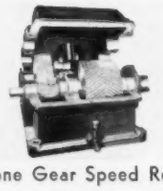


Silent Chain Drives



Roller Chain Drives

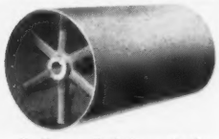
Chain Drives with Cast Tooth Sprockets



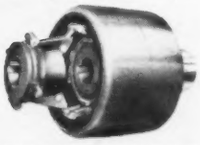
Herringbone Gear Speed Reducers

TRANSMISSION ELEMENTS

Anti-Friction Pillow Blocks



Pulleys, Solid or Split

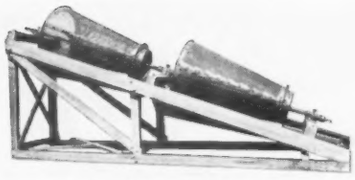


Clutches of All Types

Shaft Couplings

SCREENING UNITS

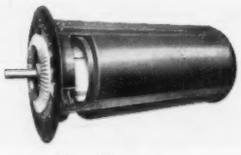
Vibrating Screens



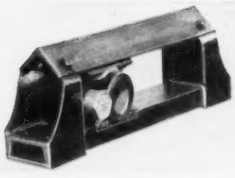
Inclined Conical Screens

Revolving Screens

OTHER ACCESSORIES

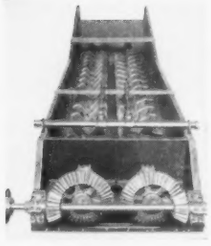


Scrubbers

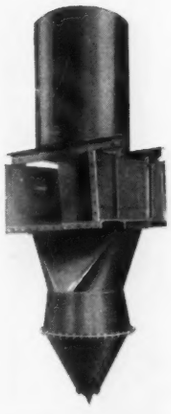


Take-ups for Every Service

Gates and Valves



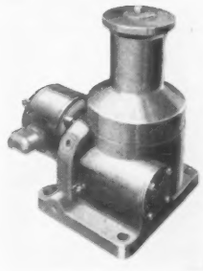
Log and Screw Washers



Sand Classifiers

Elevator Boots

Grease Cups



Car Spotter

Send for This New Book

Pit & Quarry 5004

LINK-BELT COMPANY

300 W. Pershing Road, Chicago
2045 W. Hunting Pk. Ave., Philadelphia
400 Paul Ave., San Francisco

Please send copy of Book No. 1240.

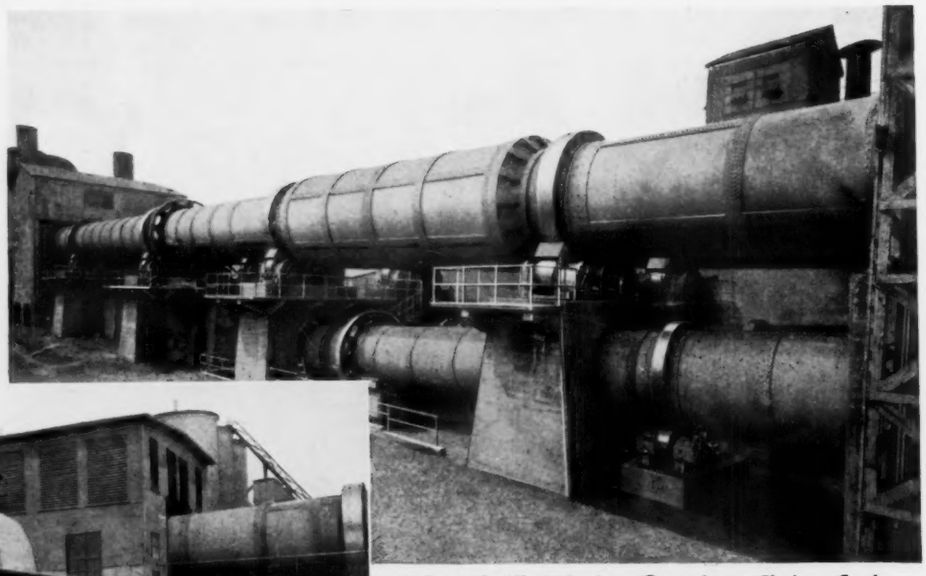
Name ..... Firm .....

Address ..... St. or Ave.

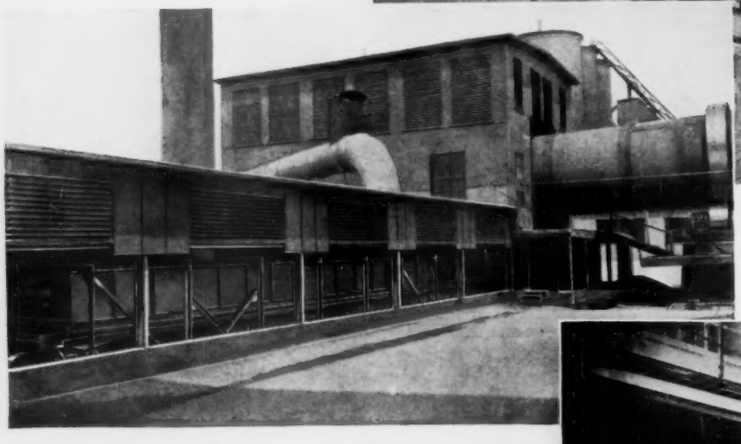
City ..... State .....

Plant Rehabilitation . . .

. . . the way to profits

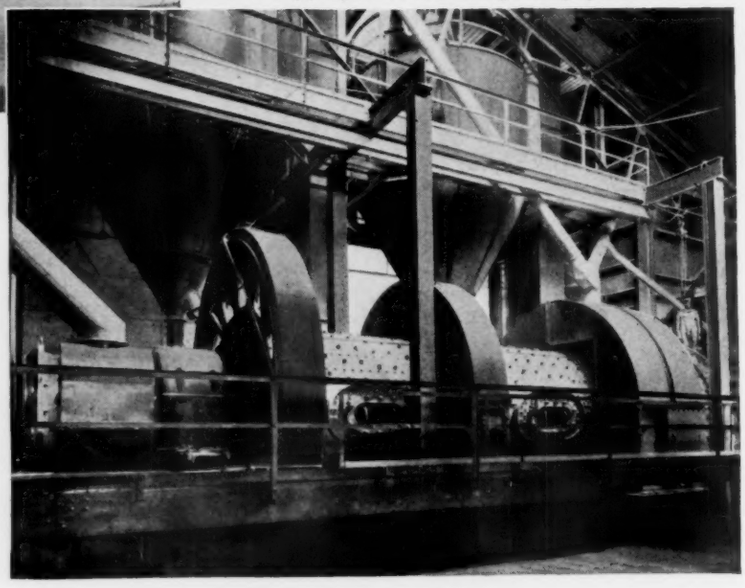


Right—11'-6" and 15' x 250', Four Support, Two Roller Type Kiln with enlarged calcining zone.



Left—4'-6"x80' Air Quenching Clinker Cooler handling output from 11'-6"x300' kiln.

Below—Dry Grinding Three-Compartment Compeb Mill using progressive classified grinding system.

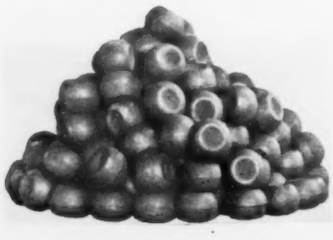


PLANT rehabilitation to obtain improved quality of product, and to reduce operating costs is "the way out" for many plants. In reconditioning existing machines the use of parts from the original equipment manufacturer is essential to assure the best results.

There are many cement plants in which substantial economies in grinding, kiln operation and clinker cooling are possible. Kilns with enlarged calcining zones result in fuel saving and a more uniform product. Air quenching clinker coolers, designed for rapid transfer of heat to cooling air, and the utilization of the recuperated heat, not only save money for fuel but also reduce grinding costs and produce better cement. Progressive grinding Compeb mills result in low power consumption, and permit a wide range of fineness control including the requirements of high early strength cement.

Modern kilns, coolers, and Compeb mills and grinding media, together with modern crushers, vibrating screens, centrifugal pumps and special motors . . . all contribute toward the production of better cement at lower cost.

Concavex are preferred for fine grinding by users who have conducted tests. You should try them. They are made of forged steel or air furnace iron.



ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

"CATERPILLAR" DIESELS

LIMA

SHOVELS
DRAGLINES
BACKDIGGERS
CRANES

SAVE 60%-80% in FUEL COSTS

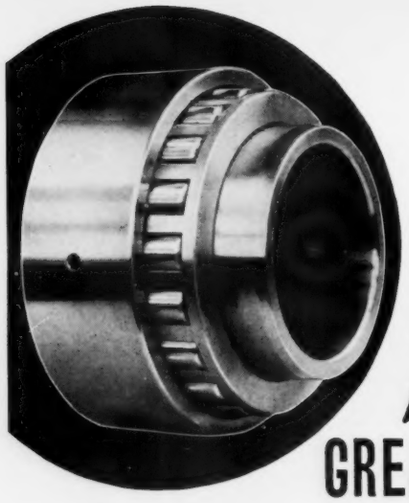
INCREASE PRODUCTION

Fuel Costs Reduced, Production Increased with LIMA "Caterpillar" Diesel Shovels, Draglines and Cranes

THE application of "Caterpillar" Diesel power to LIMA shovels, draglines and cranes brings to the user of excavating machinery a new conception of fuel economy. LIMA "Caterpillar" Diesel machines operate on inexpensive fuel, consequently fuel costs are 60% to 80% lower as compared with gasoline powered machines. This desirable feature plus the profitable advantages of roller bearings at every vital bearing point, helical gears throughout (two exclusive LIMA features), and the unusual lugging ability of the Diesel engine, result in a type of construction that will produce much greater yardage at less cost.

THE OHIO POWER SHOVEL COMPANY
DIVISION OF LIMA LOCOMOTIVE WORKS, INCORPORATED
HOME OFFICE LIMA, OHIO FACTORY

NEW YORK 167th Street and Sedgwick Avenue
The General Supply Co of Canada, Ltd. Ottawa, Ont.
CHICAGO 1543 Straus Bldg.
NEWARK, N. J. 317 Frelinghuysen Avenue
MEMPHIS 77 McCall Street
SEATTLE 2244 First Ave. So.
Tyee Machinery Company, Ltd. Vancouver, B. C.
DALLAS 1301 So. Lamar St.

Roller bearings  *for*

GREATER SPEED
LARGER CAPACITY
LOWER UPKEEP

Roller bearings—in your automobile . . . in railroad locomotives and rolling stock . . . in all modern machine tools . . . in power shovels . . . in conveying equipment. *Why not in your rock crusher?*

Telsmith-Wheeling Jaw Crushers . . . *in all sizes* . . . are equipped throughout with *cylindrical roller bearings* because—

1. The shaft of a Telsmith-Wheeling is not subjected to wear. All internal frictional wear is taken on the bearing races. (In a plain bearing crusher both shaft and bearings are subject to wear.) 2. Telsmith roller bearings both retain their lubricant and exclude dirt. (Plain bearings permit lubricant to run out and dirt to penetrate, scoring both shaft and bearing sleeve.) 3. With roller bearings, bearing centers are shortened and danger of shaft deflection is reduced. 4. Roller bearings save power. One man can turn over a large size Telsmith-Wheeling with ease. (A much smaller machine of the plain bearing type will defy two men.) 5. Roller bearings permit higher speed and larger output.

But, lower maintenance is the biggest argument for roller bearings, even though their first cost is a little more. They save that premium many times over in reduced upkeep and longer life. *Write for Bulletin W-15.*

W-11

TELSMITH WHEELING JAW CRUSHER

SMITH ENGINEERING WORKS, 504 Capitol Drive, Milwaukee, Wis.

50 Church Street, New York City. • 211 W. Wacker Drive, Chicago, Illinois. • 130 S. 15th Street, Philadelphia, Pa.
1109 Statler Bldg., Boston, Mass. • 412 Westinghouse Bldg., Pittsburgh, Pa. • Brandeis M & S Co., Louisville, Ky.

THE AIR ROADS ARE ALWAYS OPEN

"SKY-TRACKS" FOR BOULDER DAM

The World's Heaviest Duty Permanent Cableway—150 Ton Capacity

AMERICAN STEEL & WIRE COMPANY
The TIGER TRADE MARK is a symbol of Strength and Dependability
THE MARK FOR GENUINE AMERICAN WIRE ROPE

HIGH above the Black Canyon of the Colorado River man has stretched a slender web of steel—built "Sky-Tracks" across the abyss that for centuries seemed impassable. The Lidgerwood Cableways—essential to the completion of Boulder Dam—represent spans of from 1365 to 2575 feet. To assure maximum service and economy—they are equipped with American Steel & Wire Company Track Cables. With breaking strengths in excess of 500 tons each—they enable safe and rapid movement of materials and supplies. In connection with your own aerial transportation problem—whether it be large or small—you will find American Steel & Wire Company quality and service of exceptional value. We invite you to correspond with us.

1831 1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

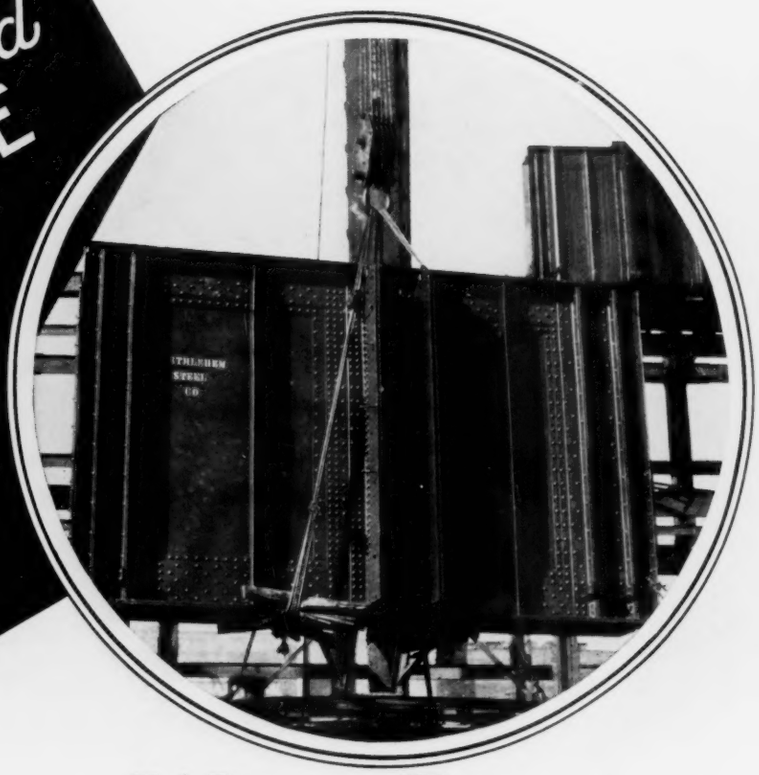
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

Empire State Building, New York
First National Bank Building, Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco

Export Distributors: United States Steel Products Company, New York

There's Superior QUALITY and Longer LIFE in



Williamsport Wire Rope

The increasing demand for specialized wire ropes has been ably met by Williamsport thru a vast amount of research, laboratory experiments and thru actual service tests.

Williamsport now offers a new improved heavy duty drag line cable—a perfected, equalized (pre-stretched) super traction elevator cable—an exceptional shovel rope and improved ropes for hoisting purposes, particularly for heavy work.

All these specialized ropes highly commend themselves to operators who have found but partially satisfactory service in the usual ropes offered for these purposes.

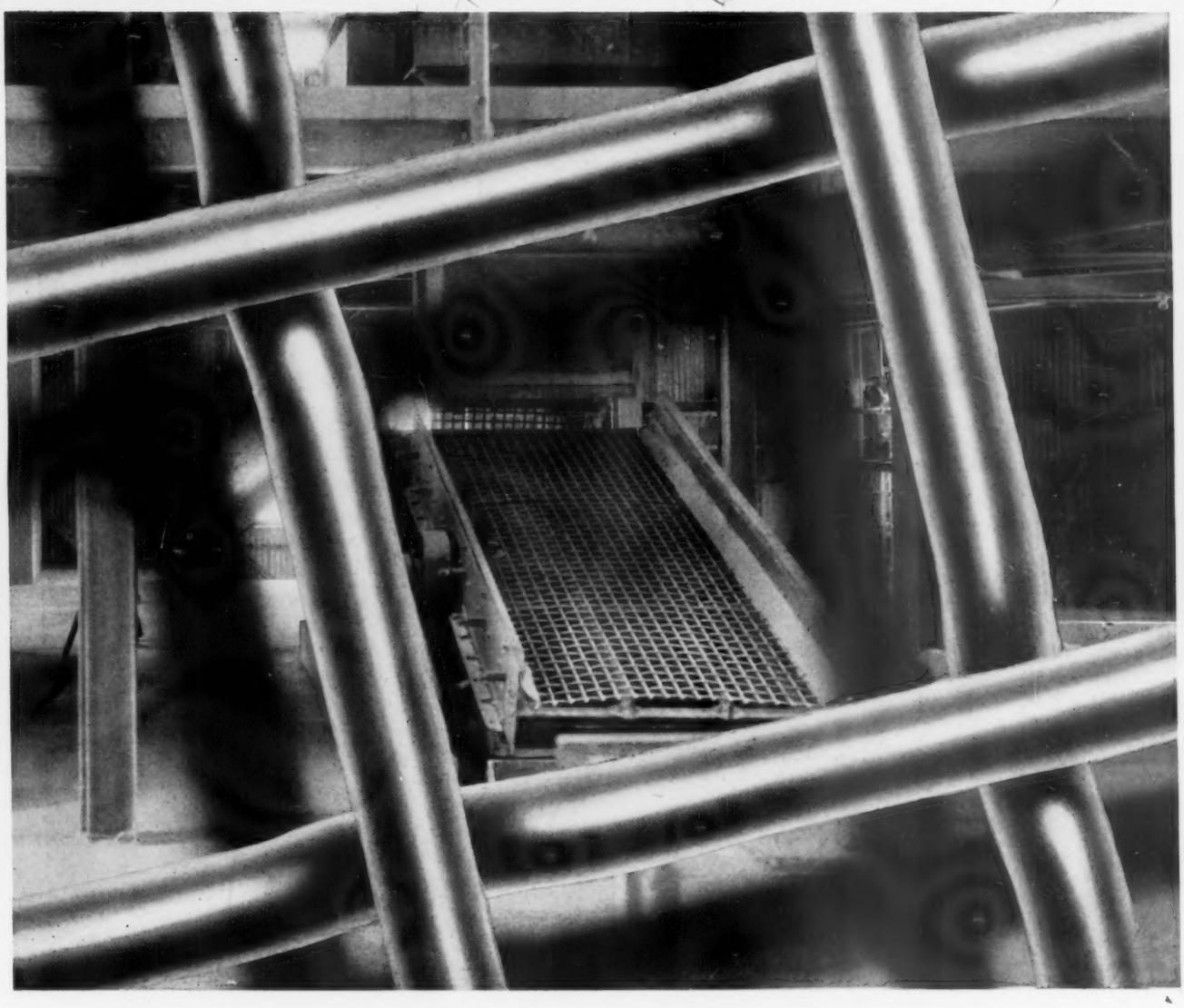
Write us for assistance in the solution of your wire rope problems.

Let us quote you on your next requirements.

WILLIAMSPORT WIRE ROPE COMPANY

Main Office and Works
WILLIAMSPORT
PENNA.

Branch Sales Offices:
122 So. Michigan Ave.
CHICAGO



Accurate Screening *Imprisoned for Life*

ROL-MAN

A TRUE MANGANESE STEEL

SCREEN CLOTH

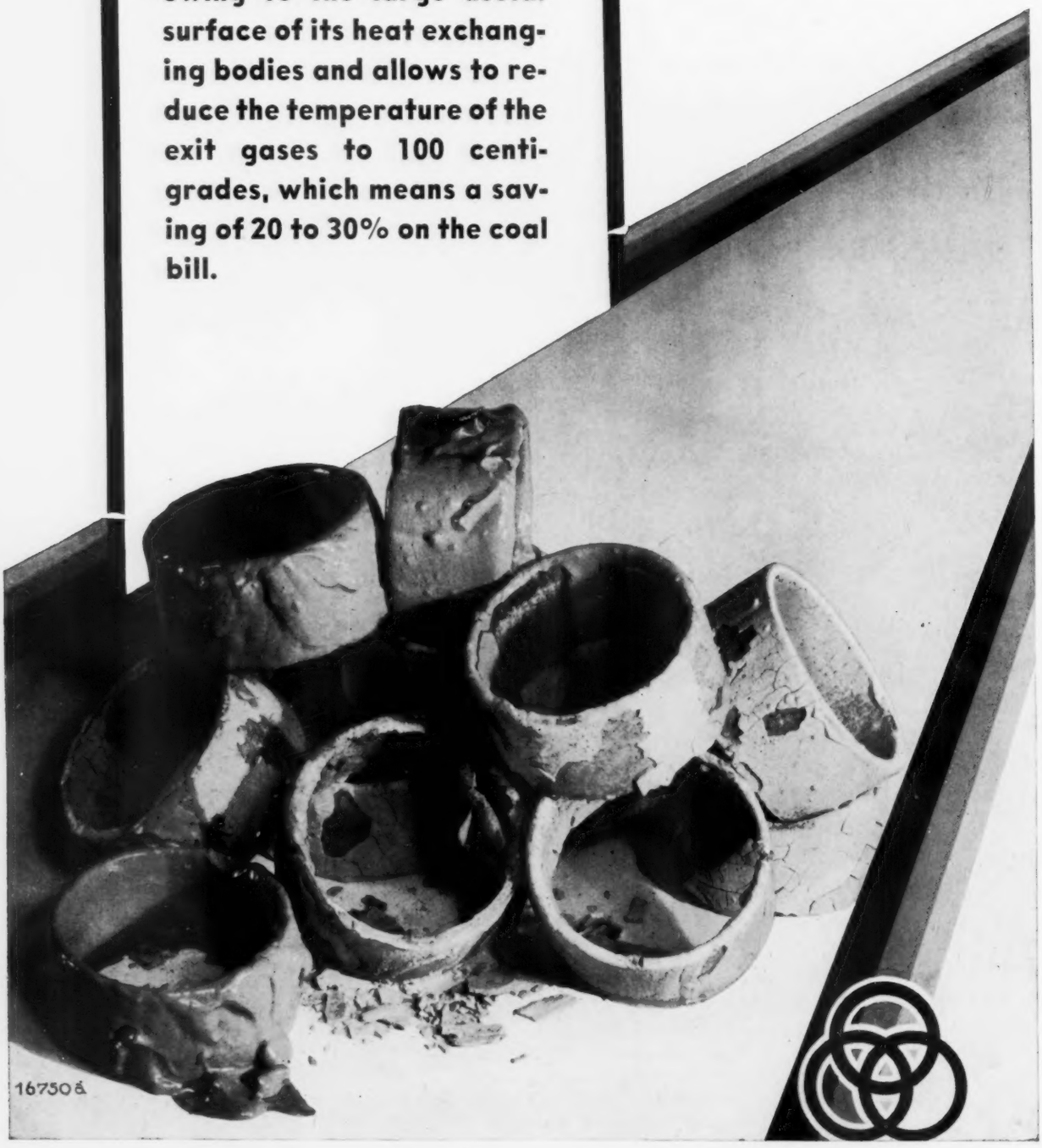
- Welding Rods -
Forgings-Plate Products

Distortion of screen openings is impossible with the Patented ROL-MAN *Double Lock Mesh* Weave for every wire or rod is imprisoned for life by deep, short down crimps at all intersections. This is a long sentence, for the ROL-MAN *Processed* Manganese Steel has the amazing facility of adapting itself to your conditions, i.e., the impact and abrasion of screening service hardens its surface and as this crust slowly wears, the metal beneath becomes callous to resist further wear. Enlargement of openings from wear is thus imperceptible. Oversize material rapidly passes over the relatively flat screen surface produced by the down crimps, thus speeding the screening action and increasing capacity. Material approaching the size of the openings passes through with minimum wiggling, thus the tendency to wedge is reduced—ROL-MAN Screen Cloth is specially prepared for application direct to any make vibrator frame. Put in a ROL-MAN now, and measure accurate screening life in months, instead of weeks. Complete information and prices on request.

MANGANESE STEEL FORGE CO.
Richmond St. & Castor Ave., Philadelphia

The KRUPP Concentrator

for the pre-drying of cement raw slurry offers free passage to the heating gases owing to the large useful surface of its heat exchanging bodies and allows to reduce the temperature of the exit gases to 100 centigrades, which means a saving of 20 to 30% on the coal bill.

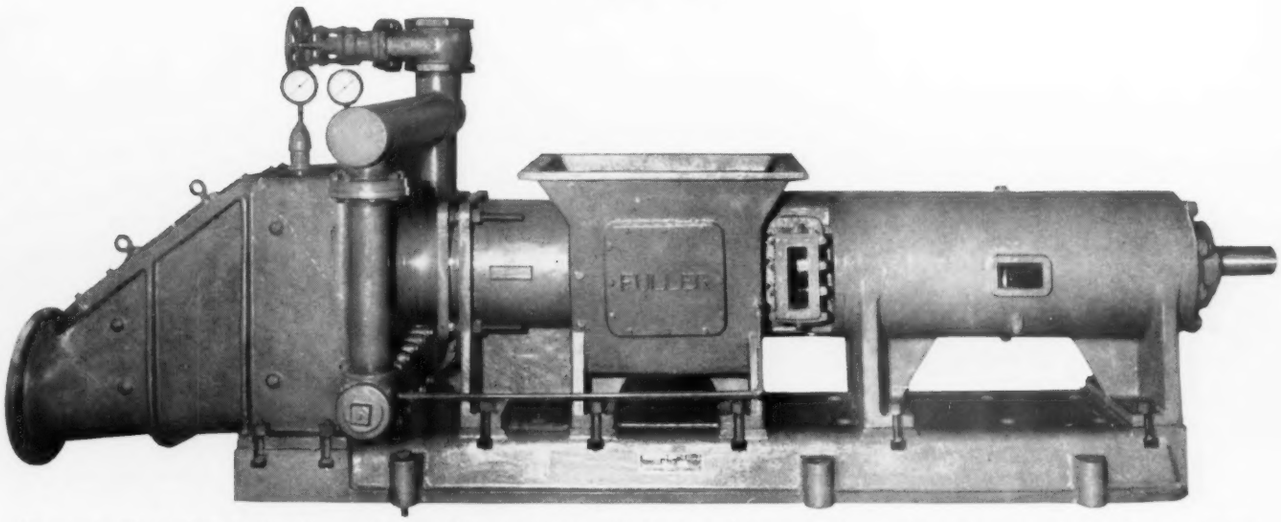


KRUPP GRUSONWERK

MAGDEBURG

Representatives: THOMAS PROSSER & SON, New York, 15 Gold Street, P. O. Box 878.

An Improved
FULLER-KINYON PUMP
TYPE H



Ten-inch, Type "H" Fuller-Kinyon Pump. This pump is available in a full range of capacities in stationary and portable types.

This new bulletin fully illustrates the many uses of Fuller-Kinyon Systems in cement and other grinding mills. We believe it will suggest new short-cuts to greater economy in handling pulverized materials.

The operating economy of this new pump is the result of many years of practical experience in the handling of pulverized materials. There is nothing experimental about it. Its mechanical improvements have been thoroughly tried under severe service conditions.

These are the new features which make it the most economical conveyor per ton of material handled: 1. Low-pressure air supply, with stable operation under all load conditions. 2. Each size has an increased capacity range. 3. The pump adapts itself automatically, with minimum power input, to variations in the rate of feed. 4. The pump seal is automatically variable to the minimum density, thereby reducing both power and wear. 5. The parts are adequately protected against wear and the design minimizes danger from tramp iron. 6. Automatic lubrication, with the correct amount of oil circulation through the bearings, regardless of oil level in the reservoir, which is an integral part of the bearing assembly. 7. The screw is removable through the front wall of the check-valve body, without disturbing the bearings or any other parts. 8. Unitary bearing assembly prevents future misalignment.

Pulverized Material Feeders and Batchers

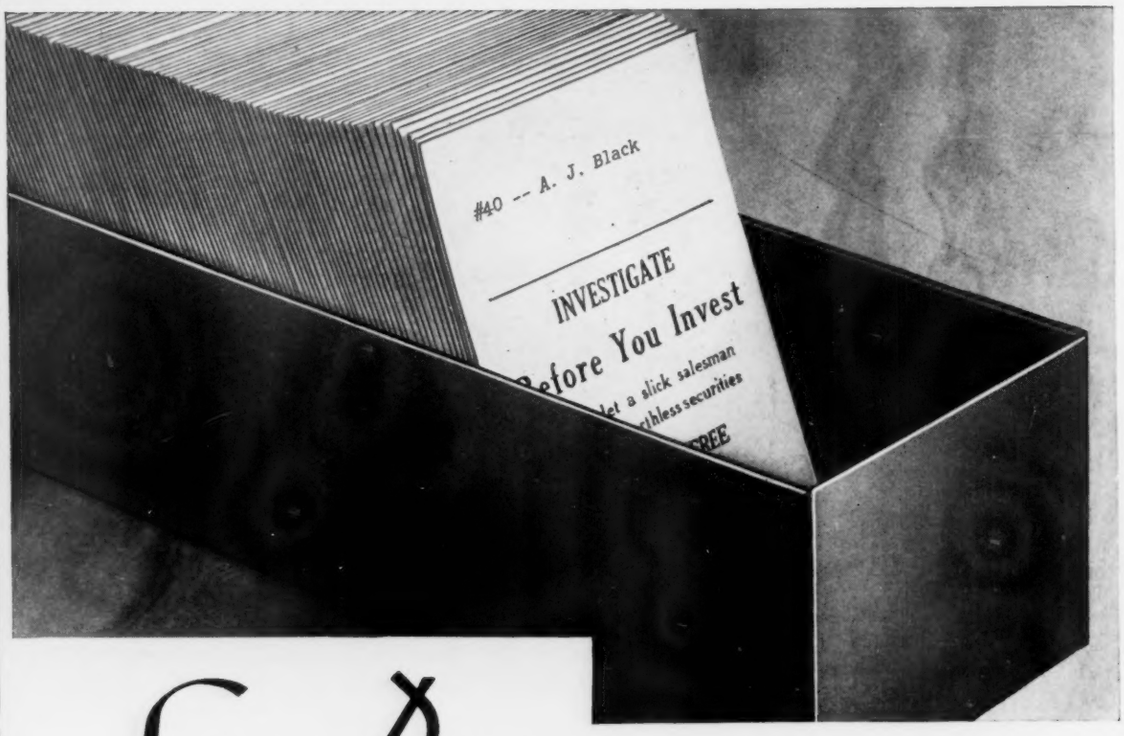
Airveyor,—pneumatic conveyors

Compressors and Vacuum Pumps

Fuller Company
CATASAUQUA, PENNA. U.S.A.

Chicago: 1118 Marquette Bldg.
Paris: E. Constantin, 105, Rue Lafayette.
Hamburg: Claudius Peters, Walhoff, Glockengiesserwall 2.

STATIONARY and PORTABLE **FULLER-KINYON** ***CONVEYING SYSTEMS***



Say Boss . . .

WHERE'S *your* PAY ENVELOPE?

Profit — where does it come from? It comes from the savings you can make by doing things better at lower cost, in less time than was figured.

Are we right? We are!

Perhaps Cordeau will help you. Cordeau-Bickford is an insensitive fuse which acts as a powerful detonator upon each cartridge in the same charge. Thus each cartridge has the added force of a primer cartridge, and gives more work.

With Cordeau you can connect each hole, and fire the entire blast at one time, yet so planned as to secure relief of burden: more work from your explosives with better control of fragmentation.

Cordeau also simplifies loading, and because it is insensitive to ordinary shock and must be detonated, its use reduces hazard.

Yes — perhaps you can use it. Why not send for the Cordeau book? It's free — to executives.

CORDEAU
DETONATING FUSE
BICKFORD

THE ENSIGN-BICKFORD COMPANY

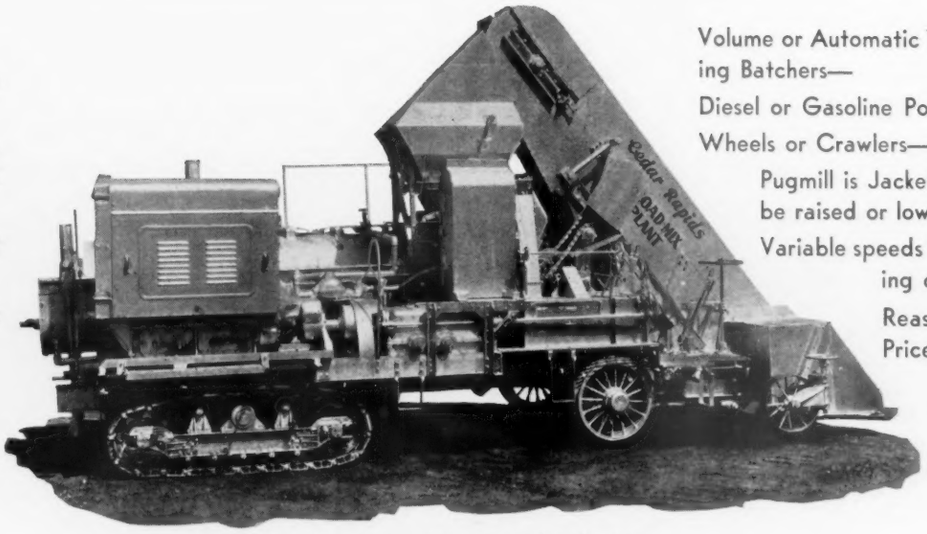
Simsbury, Connecticut

CB-32

PORTABLE OR STATIONARY ASPHALT PLANTS

FOR EVERY TYPE OF BITUMINOUS ROAD CONSTRUCTION

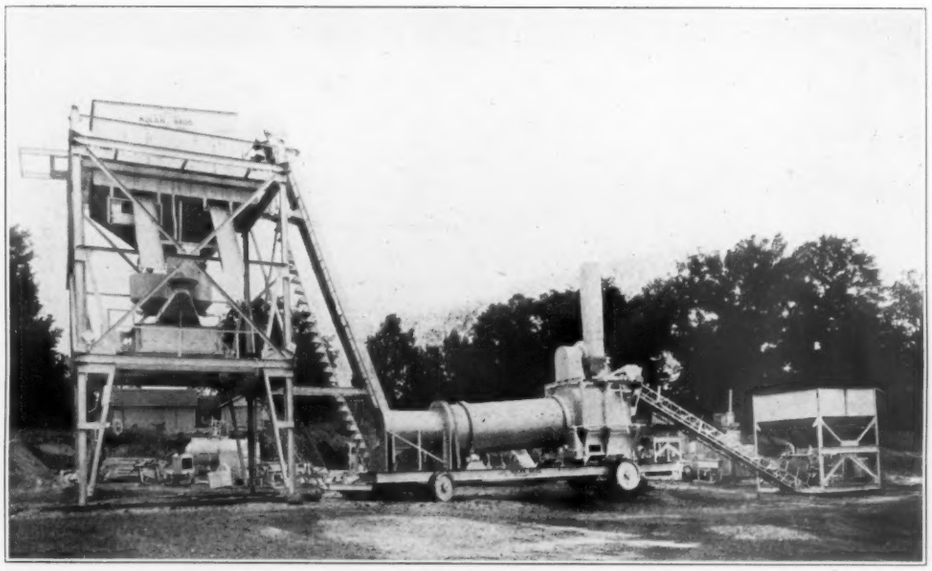
1000 gallon Storage Tank—
Side discharge delivery conveyor in rear—
Full floating front pickup—
Heaters on Storage Tank—
Large capacity—
Easy to handle—
VERY ACCURATE.



Volume or Automatic Type Weighing Batchers—
Diesel or Gasoline Power—
Wheels or Crawlers—
Pugmill is Jacketed and may be raised or lowered—
Variable speeds for all traveling conditions—
Reasonably Priced.

Cedar Rapids Traveling Road Mix Plant
Diesel Power and Mounted on Crawlers

We offer the type of asphalt plant shown here in 3 sizes—
1 ton
1½ ton
2 ton
complete with dryer
A truly portable and efficient asphalt plant.



Revolving or vibrator screens.
Gasoline, Diesel or Electric Power Weighing Batchers for aggregates and asphalt.
Detailed photos and information will be supplied upon request.
Write today for our bulletins.

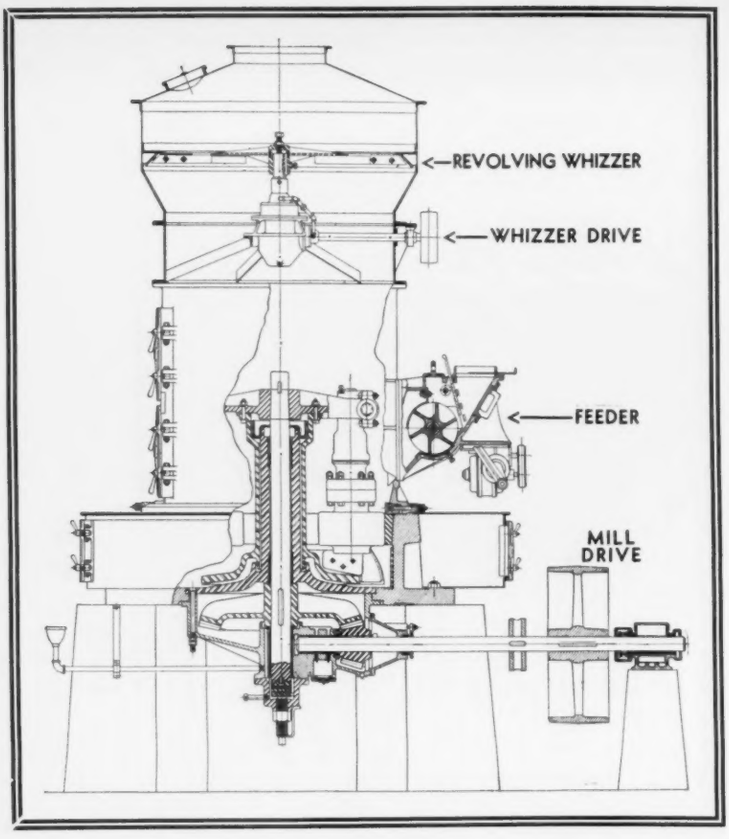
4000 Pound Batch Type Asphalt Plant
Complete with Dryer and Electric Power

—Ask for Bulletins on Cedar Rapids Black Top Plants—

IOWA MANUFACTURING COMPANY

CEDAR RAPIDS, IOWA

BUILDERS OF THE CEDAR RAPIDS LINE OF CRUSHING EQUIPMENT



NEW FINENESS CONTROL

WHIZZER-EQUIPPED ROLLER MILL

Wide range of fineness
Instantaneous control
Larger mill output
Clogging eliminated
Uniformity in separation
Economy in operation

THE patented whizzer—so successfully used in Raymond Mechanical Air Separators—is now applied to Raymond Roller Mills. Result—a new degree of flexibility in fineness control.

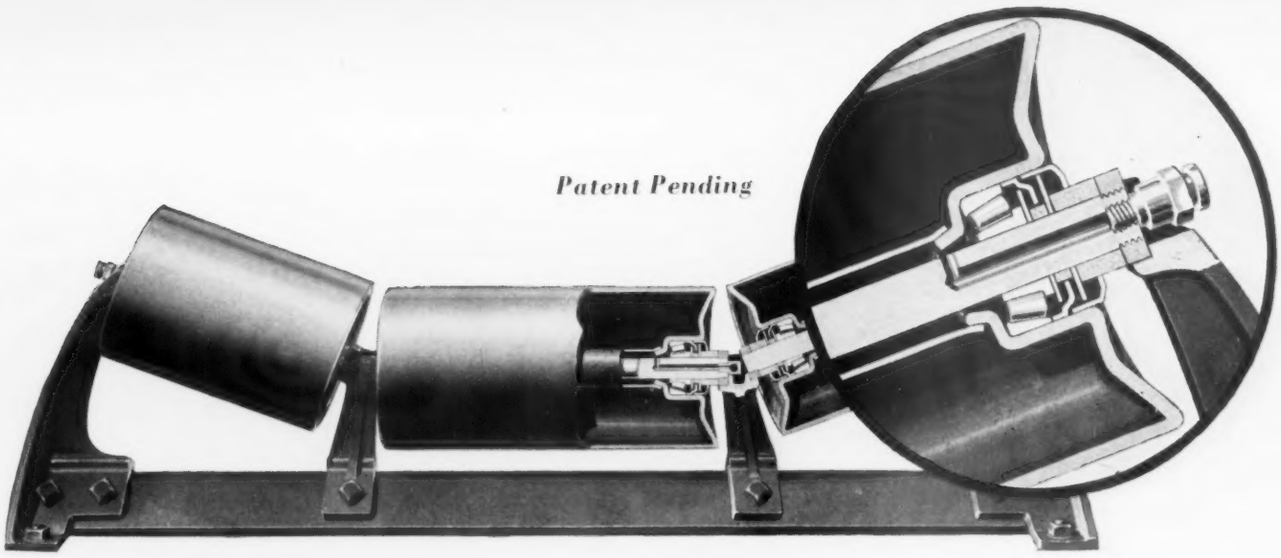
The whizzer revolves in the air drum above the mill, and is driven by a separate motor through a variable transmission. By simply moving a hand lever, you can vary the speed of the whizzer blades, and so regulate the classification of the finished product as desired—no vanes to set, no adjustments to make.

This gives a wide range of fineness, instantly available, from about 80% through 100-mesh to 99.5% passing 325-mesh or better. It is an efficient method of pulverizing various products into several grades, as required in custom-grinding plants.

Write for further details, as this new development may be applicable to your product—with the economy of ***one*** mill for ***all*** your operations. RAYMOND BROS. IMPACT PULVERIZER CO., Main Office and Works: 1321 North Branch Street, Chicago. Sales Offices in New York and Los Angeles.

RAYMOND

PULVERIZING, SEPARATING, AIR DRYING AND DUST COLLECTING EQUIPMENT



Patent Pending

Look Again . . .

A close scrutiny of the magnified section (above) of the Jeffrey Reliance steel Belt Idler and a careful study of its many outstanding features (right) will readily show you why so many large companies in the Rock Product Industry are turning to Jeffrey Belt Conveyors for satisfactory and economical service.

Long experience in designing and manufacturing belt conveyors has enabled Jeffrey to build into the Reliance Idler every feature essential to provide belt protection, long, reliable service and power economy.

Because of the universal design of this Idler, its application is extended to all fields where belts are called upon to solve bulk material handling problems.

Jeffrey Reliance Idlers are available in three types: Troughing, Picking Belt and Flat Belt with three styles of return hangers: Bottom Hanging, long or short side hangers. Furnished with 4-in., 5-in. or 6-in. diameter rolls for belt widths up to 60 in.

Complete information covering this Jeffrey Reliance Belt Idler will be sent on request. Write today.

Study These Features:

- Heavy steel end, electric welded to tube, shaped to deflect dirt away from grease seal.
- Outer shells of the rolls are high quality steel tubing
- Double Labyrinth grease seal
- Die forged Hexagon Head
- Timken Roller Bearings
- Flow of grease is always outward through bearings
- Full diameter shaft—not weakened by shouldering
- Alemite fittings
- One piece die straightened malleable iron End Stands
- Inverted "V" self-cleaning base
- Interchangeable rolls, easily removed

The Jeffrey Manufacturing Company

917-99 North Fourth St., Columbus, Ohio

New York	Pittsburgh	Detroit	Denver
Buffalo	Boston	Chicago	Salt Lake City
Rochester, N. Y.	Scranton, Penn.	Huntington, W. Va.	Birmingham
Philadelphia	Cincinnati	Milwaukee	Dallas
	Cleveland	St. Louis	

Jeffrey Manufacturing Company, Ltd., of Canada
Head Office and Works, Montreal—Branch Offices, Toronto, Calgary, Vancouver

JEFFREY MATERIAL HANDLING EQUIPMENT

Jeffrey Products

Chains and Attachments
Sprocket Wheels—Gears
Elevators—Conveyors
Trolley Conveyors
Portable Loaders
Coal and Ashes Handling Equipment
Electric Vibrating Screens, Feeders and Conveyors
Sand and Gravel Handling, Washing and Screening Equipment
Crushers—Pulverizers
Locomotives

A COMPANION For Your SALES KIT

NOW READY

How—

—accurate and complete are your prospect lists?
—much "deadwood" is there on your prospect lists?
—much do you know about your prospects?
—much do you waste per year on poor lists?
—many "not there" calls do your men make?
—much do you know about new developments?

The pit and quarry industries are more active now than they have been in years. In fact, it's one of the most active fields in industry. It's natural. For before the roads, dams, bridges, buildings, etc., can be built under the public works program the raw material has to be furnished.

Get your share of it. Don't miss fire with poor prospect lists. Don't lose sales because you had "never heard of that fellow before."

These lists are the most complete ever published. They contain hundreds of new names. They have been completely revised—all listings have been brought up to the minute.

Regardless of whether your territory covers only one state or the whole country the investment in a copy of Pit and Quarry Handbook is something that will pay big dividends—in sales.

To Delay Is to Lose Sales—The Field Is Active—
It Is Buying—Order This Selling Helper Today

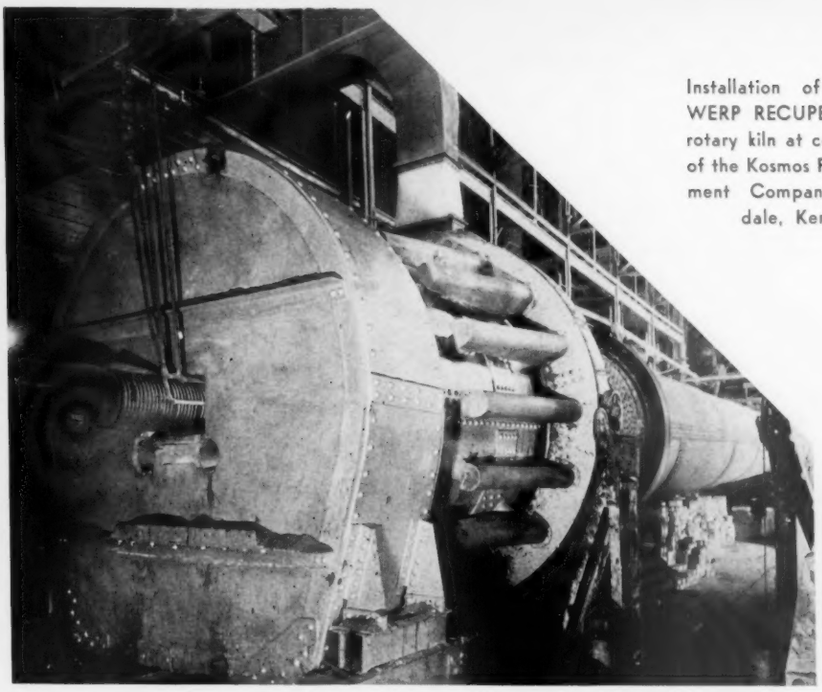
PIT AND QUARRY, 538 S. Clark St., Chicago, Ill.
As Soon As Published:

☐ Send ..... copies of the 1934 Pit and Quarry Handbook and Directory ($10.00 per copy).
☐ Send ..... copies of the separately bound Pit and Quarry Directory ($10.00 per copy).
☐ Remittance Enclosed. ☐ Will Remit Promptly on Receipt of Invoice.

My Name ..... Title .....

Firm .....

Address 7-34



Installation of VANDERWERP RECUPERATOR on rotary kiln at cement plant of the Kosmos Portland Cement Company, Kosmosdale, Kentucky.

Sensational Savings!

for the CEMENT INDUSTRY

EVERY operator should study the far-reaching advantages of the Vanderwerp Recuperator as applied to his own plant. This outstanding development brings to the cement industry such large fuel economies that it is recognized as essential equipment for the profitable operation of rotary kilns.

Consider what it is accomplishing today in a typical Vanderwerp Recuperator installation on two 8½′x125′ dry-process kilns with induced draft and waste-heat boilers:

Actual average coal saving	18%
Increased kiln production	10%

This installation, which has been operating since early in 1934, shows further that the grindability of the clinker is improved due to the rapid pressure cooling, and also the quality of the cement is bettered, as proved by test breaks indicating increased early-strength. The clinker discharges at 750° to 800° F., as compared to 2000° formerly, while the preheat of combustion air is estimated at about 1000° F.

The Vanderwerp Recuperator is not only practical in application, but also practical as a plant investment. It pays large returns in operating economies, due to its small initial outlay and low maintenance. Full details on request.

Write for PERFORMANCE RECORDS

VANDERWERP RECUPERATOR

Manufactured by

MANITOWOC ENGINEERING WORKS

MANITOWOC, WISCONSIN

Chicago Office: A. W. Catlin, Special Representative, 131 River St., Michigan Ave. Bridge

The secret of APEX is controlled force–

HERE ... Explosive gases are *wasting away* in the air

HERE ... with APEX they're *working away* to produce more rock

WHEN gases escape a part of the blasting force escapes with them—a part of the blast is wasted. Some blasting methods permit useful gases to get away in the air without doing their job. Apex blasting controls the force of the blast so that the explosive gases are confined to work against the rock with little escape into the open air.

Look at the pictures. Then look to Apex and electric firing to help cut your blasting costs—right now. The balanced power of Apex offers new economies. The new action of Apex stresses burdens and causes favorable breakage and fragmentation.

Let the Atlas representative arrange a demonstration that will prove how Apex cuts drilling costs, blasting costs—and shovel costs.

ATLAS EXPLOSIVES

NRA

ATLAS POWDER COMPANY

A proper explosive for every blasting requirement

WILMINGTON, DELAWARE

Cable Address—ATPOWCO

BRANCH OFFICES:

Allentown, Pa.; Boston, Mass.; Denver Colo.; Houghton, Mich.; Joplin, Mo.; Kansas City, Mo.; Knoxville, Tenn.; Memphis, Tenn.; New Orleans, La.; New York, N. Y.; Philadelphia, Pa.; Pittsburg, Kans.; Pittsburgh, Pa.; St. Louis, Mo.; Tamaqua, Pa.; Wilkes-Barre, Pa.

ATLAS EXPLOSIVES

VOLUME 27 NUMBER 1

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, JULY, 1934

Strike Situation Eases in Ohio Lime District

WORKERS RETURN TO JOBS

On June 9 the management of the Ohio Hydrate & Supply Co., of Woodville, O., reached an agreement with its employees ending the strike at that plant. No agreement has been reached at the plants of the National Lime & Stone Co., at Carey, O., or at the plant of the Herzog Lime & Stone Co., at Forest, O. No further trouble has developed in the northwestern Ohio finishing-lime district, although it is reported that a strike is in prospect at a stone quarry not making lime in this territory. The Herzog company obtained an injunction limiting the number of pickets and attempted to start operating. This injunction was violated by strikers who were later found to be in contempt of court. Operation was again started but was halted by a mob from Carey and other towns. Leaders in the strike at the Herzog plant have been successful in calling a strike of the union workers of Hardin County in which this plant is located, thereby putting about 1,000 men out of work and throwing some 400 families on state relief.

Fred Witmer, president of the Ohio Hydrate & Supply Co., says that his company never had any trouble with its workmen from the time the company was started until a number of the men in the district joined the Quarry Workers' International Union, which organization took a general strike vote. The Ohio Hydrate workers had no grievance against the company from the standpoint of wages paid or working conditions; they merely wanted recognition.

They went back to work on June 9 and the minimum rate of wages paid since this date is the same as the rate paid prior to the time the men went on a strike; namely, 44 c. per hr. for common labor. This is 6½ c. per hr. above the scale fixed by the Code Authority. Other workmen are being paid as follows: Drawmen 45 c., lime pickers 45 c., ground lime operator 45 c., teamsters 44 c., recrusher operators 46 c., gasoline-locomotive operators 46 c., pitmen 46 c., coal passers 46 c., kiln hoistmen and dumpers 46 c., kiln firemen 46 c., well-drillers 47 c., boiler firemen 47 c., stone-drier operators and baggers 47 c., hydrated-lime baggers 19 c. per ton; hydrator men 52 c., electric-shovel operator 58 c., gas-electric crane operators 45 c., repair men from 47 c. to 60 c. per hr.

Alpha First in U. S. to Install Miag Calcinator

★ The Alpha, Mo., plant of the Alpha Portland Cement Co. has the distinction of being the first American cement plant to be equipped with a Miag Calcinator. This machine, described and illustrated on pp. 48-49 of the May issue of PIT AND QUARRY, is made by the Miag Muhlenbau und Industries A.-G. of Braunschweig, Germany, and is sold in this country exclusively by the Bradley Pulverizer Co., Allentown, Pa. More than 70 of these machines are in operation in other parts of the world. Dr. K. O. Steinbrück, chief engineer of the Miag firm in Germany, recently spent three months in this country in the interest of the Calcinator.

Michigan State Cement Plant Disposal Ordered

Following a legislative decree that "it must either be sold, operated or dismantled by July 1, 1934," the Michigan state administrative board recently opened bids on the old state cement plant at Chelsea. The finance committee can either accept or reject the three highest bids for the property which includes 20 buildings, 800 acres of land and an inland lake. If bids are not accepted the plant will be dismantled and salvaged. A report from the board's secretary, B. J. Abbott, places the value of the plant at $40,000 exclusive of land.

The three high bids are: Norman Levy, Chicago, $41,250; Michigan Portland Cement Co., $40,100; Joseph E. Zilk, Ann Arbor, $40,000. The Michigan Portland Cement Co. has announced its intention to operate the plant for the manufacture of cement; the Zilk bid is for operation of the plant for the manufacture of fertilizer. Mr. Levy has not announced his plans.

PWA Road Work 92.9% Under Way or Finished

241,192 MEN NOW EMPLOYED

Progress made on the emergency construction of public works highways to June 23 under the supervision of the United States Bureau of Public Roads shows that a total of 8,098 projects, estimated to cost $397,828,000, had been advertised for contract, begun by day labor employed directly by the highway authorities, or completed. The cost of the day-labor projects included in the above is estimated at $28,799,000.

Of the 7,704 projects awarded for construction, 4,963 were under construction on June 23 and 2,161 were completed. The work under construction, which is estimated to cost $287,094,000, was giving regular employment to 246,192 men.

In the whole country work under way and completed involved 92.9 per cent. of the $400,000,000 provided for public-works highways under Sec. 204 of the National Industrial Recovery Act.

Will Build Soapstone Plant Near Scuffletown

The Virginia Mining & Management Corp., Richmond, Va., has leased the property of the Rapidan Soapstone Corp., consisting of 240 acres near Scuffletown, Va. It is planned to develop these deposits and to erect a plant at Orange, Va., to process the material.

The France Stone Co., Toledo, O., is reported to have purchased the plant and property of the Higgins Stone Co. at Bellevue, O. The quarry and crushing plant and the 155-acre property are said to have been sold for about $75,000.

★ A unit-type coal pulverizer for direct firing of one of its cement kilns has been purchased by the Marquette Cement Mfg. Co. The machine, which is being furnished by the Babcock & Wilcox Co., will be installed at the Marquette plant at LaSalle, Ill.

New Road Bill Provides $772,000,000 for 3 Years

STATES GRANTED $200,000,000

During the next three fiscal years $772,000,000 of new money will be spent for road construction in the United States. This amount is made available by the Hayden-Cartwright road bill (H. R. 8, 781) which was passed by Congress on June 9 and signed by the President on June 18 and by the state expenditures which are expected to match the Federal-aid fund of $250,000,000.

Under its provisions $200,000,000 is appropriated for direct grants to the states, the apportionment, announced on June 19 by Acting Secretary of Agriculture Tugwell, setting aside the sums shown in the accompanying table. This sum is available for expenditure between July 1, 1934, and June 30, 1935.

The total of $772,000,000 is made up of the following items:

Expenditure and Authorizing Section	To Be Spent Between July 1 and June 30 of		
	1934–1935	1935–1936	1936–1937
Federal Expenditures:			
Outright grant to states (Sec. 1)[1]	$200,000,000	.....	.....
Forest, park, Indian reservation and public-land roads (Sec. 2)[2]	24,000,000	.....	.....
Federal aid to state (Sec. 4)[1]	.....	$125,000,000	$125,000,000
Forest roads (Sec. 5)[1]	.....	10,000,000	10,000,000
Public-land roads (Sec. 6)[1]	.....	2,500,000	2,500,000
National-parks roads and trails (Sec. 8)[1]	.....	7,500,000	7,500,000
Indian-reservation roads (Sec. 8)[1]	.....	4,000,000	4,000,000
	$224,000,000	$149,000,000	$149,000,000
State Expenditures to match Federal aid	.....	125,000,000	125,000,000
	$224,000,000	$274,000,000	$274,000,000

[1] To be administered by the United States Bureau of Public Roads.
[2] To be administered by the Public Works Administration.

The provisions of the act may be summarized as follows:

Sec. 1.—Authorizes $200,000,000 as a 100-per cent. grant to the states to be apportioned by the Secretary of Agriculture "immediately upon the passage of this act under the provisions of Sec. 204 of the National Industrial Recovery Act." (This apportionment has already been made as shown in the accompanying table.)

"The Secretary of Agriculture shall act upon projects submitted to him under his apportionment of this authorization and his approval of any such project shall be deemed a contractual obligation of the Federal government for the payment of its proportional contribution thereto."

Twenty-five per cent. is required to be "applied to secondary or feeder roads, but the Secretary of Agriculture upon request and satisfactory showing from the highway department of any state may fix a less percentage" for projects of this classification in any state.

Funds under this grant are to be available for providing "safer traffic facilities or definitely eliminating existing hazards to pedestrian or vehicular traffic."

Sec. 2.—Authorizes $24,000,000 for distribution by the P. W. A. for forest, parks, indian-reservation, and other public-land roads under provisions of Sec. 205, N.I.R.A.

Sec. 3.—Provides that not to exceed $10,000,000 of any money appropriated for highways authorized shall be available at any time for expenditure by the Secretary of Agriculture in meeting emergency repairs for reconstruction on Federal-aid highway systems necessary because of the damage by floods, hurricanes, earthquakes, etc.

Sec. 4, 5, 6, 7, and 8 provide the amounts set out above for the purposes designated as annual authorizations for each of the two fiscal years 1936 and 1937. Sec. 4 provides that apportionments to states are to "be available for expenditure for one year after the close of the fiscal year for which . . . authorized." Unexpended sums then remaining are to be reapportioned among the states as provided by Sec. 21 of the Federal Highway Act.

Sec. 9.—Amends the Federal Highway Act to include "main parkways" within the meaning of the term "highway" for the period of this act.

Sec. 10.—The Secretary of Agriculture is required to submit his report on or before the first Monday in January of each year instead of December.

Sec. 11.—"With the approval of the Secretary of Agriculture not to exceed 1½ per cent. of the amounts apportioned for any year to any state under Sec. 1 and 4 of this act may be used for surveys, plans and engineering investigations of projects for future construction in such state either on the Federal-aid highway system and

(*Continued on page 48*)

APPORTIONMENT OF THE 1934-1935 FEDERAL GRANT FOR HIGHWAYS

	Sums Apportioned		
	Seven-Eighths According to Sec. 21 of the Federal Highway Act	One-Eighth According to Population	Total Apportionment
Alabama	$3,722,613	$537,229	$4,259,842
Arizona	2,553,507	88,428	2,641,935
Arkansas	3,051,561	376,488	3,428,049
California	6,779,637	1,152,569	7,932,206
Colorado	3,275,724	210,282	3,486,006
Connecticut	1,128,642	326,226	1,454,868
Delaware	875,000	48,395	923,395
Dist. of Col	875,000	98,842	973,842
Florida	2,363,274	298,069	2,661,343
Georgia	4,523,020	590,471	5,113,491
Hawaii	875,000	74,778	949,778
Idaho	2,187,138	90,348	2,277,486
Illinois	7,372,261	1,549,140	8,921,401
Indiana	4,431,497	657,466	5,088,963
Iowa	4,616,722	501,639	5,118,361
Kansas	4,735,803	381,872	5,117,675
Kentucky	3,287,509	530,802	3,818,311
Louisiana	2,537,276	426,656	2,963,932
Maine	1,549,697	161,889	1,711,586
Maryland	1,478,833	331,225	1,810,058
Massachusetts	2,487,737	862,737	3,350,474
Michigan	5,469,502	983,066	6,452,568
Minnesota	4,905,029	520,522	5,425,551
Mississippi	3,132,202	408,025	3,540,227
Missouri	5,436,923	736,817	6,173,740
Montana	3,660,592	109,142	3,769,734
Nebraska	3,684,616	279,748	3,964,364
Nevada	2,283,870	18,486	2,302,356
New Hampshire	875,000	94,462	969,462
New Jersey	2,400,426	820,453	3,220,879
New Mexico	2,855,760	85,940	2,941,700
New York	8,772,350	2,555,571	11,327,921
North Carolina	4,197,326	643,615	4,840,941
North Dakota	2,800,745	138,222	2,938,967
Ohio	6,515,630	1,349,382	7,865,012
Oklahoma	4,198,747	486,433	4,685,180
Oregon	2,904,181	193,633	3,097,814
Pennsylvania	7,635,476	1,955,312	9,590,788
Rhode Island	875,000	139,572	1,014,572
South Carolina	2,417,958	352,996	2,770,954
South Dakota	2,906,984	140,659	3,047,643
Tennessee	3,771,790	531,201	4,302,991
Texas	11,108,746	1,182,507	12,291,253
Utah	2,029,590	103,101	2,132,691
Vermont	875,000	73,007	948,007
Virginia	3,273,714	491,673	3,765,387
Washington	2,789,019	317,393	3,106,412
West Virginia	1,929,280	351,055	2,280,335
Wisconsin	4,345,174	596,663	4,941,837
Wyoming	2,241,919	45,793	2,287,712
Totals	$175,000,000	$25,000,000	$200,000,000

Sand and Gravel Assn. Directors Hold Meeting

ASSOCIATION WORK STRESSED

The board of directors of the National Sand & Gravel Assn. held its annual meeting at the Palmer House, Chicago, Ill., June 5 and 6. This meeting was attended by a majority of the directors representing almost every section of the country. Routine association affairs were disposed of and future activities discussed. In the opinion of those present code activities should be continued, but greater effort should be devoted to the original purposes of the association. Research activities are to be resumed on a scale comparable to that of earlier years and expansion of the association membership and its work are to receive more attention.

It is believed that trade associations will become increasingly important factors in the self-government of industry and efforts are to be made to obtain a larger and more representative membership. As a preliminary step in this direction the dues have been reduced to 30 per cent. of the former scale and an active membership campaign is contemplated.

The holding of the next annual convention of the association was also discussed. This will be held in conjunction with the conventions of the crushed-stone and slag associations. Those present were in favor of resumption of the machinery exhibit which has been an important part of these conventions but which was omitted at the last convention because of the predominance of code affairs at that time. This matter was referred to the Manufacturers' Division for decision. It was announced that publication of the association's Bulletin would be resumed.

Three additional directors representing the industrial sand division were elected subject to convention approval. They are: A. Warsaw, Chicago, Ill.; R. S. McDougall, Ottawa, Ill.; and A. J. Miller, New York, N. Y. It was also suggested that the association include in its activities some work of special value to producers of industrial sands. The silicosis problem, which is at present of primary importance to these producers, is also said to be a growing problem among sand-and-gravel producers and should receive attention.

Considerable time was also devoted to discussion of ways and means for combating the diversion of state gasoline and vehicle-tax funds and unfair competition from plants operated by counties, states and other governmental bodies. In some cases, it was said, these plants are selling part of their products in direct competition with those of privately-owned plants. Most of these plants do not respect the code requirements as to hours and wages which regulate commercial plants.

Holds Division of Gas Tax Unconstitutional

ALL MOTOR TAXES AFFECTED

Motor-vehicle tax diversion received a set-back in Ohio recently, when Judge Stanley Struble of the Court of Common Pleas of Hamilton County held unconstitutional that section of the state code which authorized the diversion. The suit was brought by taxpayers against Hamilton County officials and sought recovery of the funds diverted for purposes other than highways during 1932 and the first eight months of 1933.

Records show that Hamilton County had diverted from highway use during 1932 some $600,000 out of a total of nearly $800,000 allotted to the county out of automobile license fees. Diversion for the 8-month period in 1933 showed that out of a total of nearly $750,000 the county had diverted more than $444,000 to the general fund, $65,000 to the library fund and $110,000 to the sinking fund. Only a small portion of the automobile-registration fees for 1932 and 1933 was used for highway purposes. The diversion to other purposes was under the claimed or pretended authority of a certain section of state law which permitted diversion of about 52 per cent. of the license fees collected in 1932 and 1933. It is this section of the general code which was held unconstitutional by the Court of Common Pleas.

Judge Stanley Struble, in ruling the diversion unconstitutional, observed that in his judgment *the only way to assure motor vehicle owners that these special taxes are to be reasonable is to require that the moneys from them be spent entirely upon the public roads and highways.* The attorney general had held valid the diversion of a part of the motor vehicle fees for a limited time, indicating that the emergency justified such a ruling.

Judge Struble observed in part as follows:

If constitutions, United States and state, are to give way, become inoperative in the face of an emergency, who, may I ask, is to decide the existence of such an emergency, and what are the principles by which the question may be determined? I consider neither the United States nor the state constitution merely fair weather documents. If the United States and state constitutions are not ports that may be entered in a storm, for protection of the rights of persons and property, then they are of little value. In fair weather we can haul up to a shallow beach or tie up to a willow bush.

There are practical questions involved in the matter before the court. The public roads and highways are a basic necessity for the profit and pleasure of the people. Their modernization, both as to construction and up-keep, must keep pace with motorized travel and traffic, and this will cost money and lots of it. Who, may I ask, are to pay the cost of the public roads of the state if the moneys from excise taxes paid by the owners and users of the public roads are to be used for other purposes? Why, if not through excise taxes levied against the owners and users of motor vehicles, then the cost must come out of general revenues or by assessments on abutting property. Abutting property owners should be left out of the picture except so far as they are a part of the public or owners and users of motor vehicles. To assess abutting property for any part of the cost of the public roads, having in mind the high cost of construction and up-keep of present day roads and the kind of travel and traffic, is manifestly unfair.

Before the advent of the motor vehicle the public roads were almost wholly a matter of local importance, and local people paid practically the whole cost of their construction and up-keep, and that was proper, because they were primarily for the benefit of the local people. The coming of the motor vehicle into modern life has wrought a change in the character of the public roads in the sense that they cease to be primarily a matter of local interest, but have become primarily a matter of necessity and interest to the general public, hence, their construction and up-keep should either be charged to the owners and users of them or paid out of the general revenues.

Besides the injustice to the owners and users of motor vehicles resulting from the diversion of these fees to other than highway purposes, the result of a policy of this sort will be a gradual deterioration of the highways of the state and a let-up in the development of the highway system of the state.

Cement Plants Reopen After Long Shutdowns

HIGHWAY DEMANDS INCREASING

Ordinarily at this season of the year those cement plants expected to be operated at all during the year are already in operation. This year, however, the resumption of operations in many cases was delayed by the fact that many states were slow in getting their road building and other construction projects under way. The following plants are reported to have resumed operations during June: Wabash Portland Cement Co., Stroh, Ind.; Lehigh Portland Cement Co., Iola, Kans.; Beaver Portland Cement Co., Gold Hill, Ore.; Crescent Portland Cement Co., Wampum, Pa.

The Lancaster Gravel Co. was recently organized by Paul S. Klyne and J. B. Clawson, both of Columbus, O., and has established a plant at Hooker's Station, near Lancaster. A complete line of new equipment, including crushers, screens and washing equipment, has been installed. Both men have had long experience in the sand-and-gravel industry.

Public N.R.A. hearing on proposed changes in the lime-industry code held at Washington on May 24 and 25. The N.R.A. officials seated at the table (beginning with the second one from the left end) are: Col. A. Vorhis, N.R.A. representative on the Code Authority; E. L. Culver, Consumers' Advisory Division; S. R. March, Research and Planning Division; J. M. Gallagher, Legal Advisory Division; Assistant Deputy Administrator Ralph Fogg, chairman of the hearing; Deputy Administrator C. L. Hickling; John Goshie, Labor Advisory Division; G. F. Ashley, Industrial Advisory Division.

P.W.A. Road Building Runs $1,000,000 Daily

22,000 MILES ALREADY IMPROVED

Record speed in putting highway work under way is reported by the Bureau of Public Roads, United States Department of Agriculture. On June 23, 1934, just one year after apportionment of the $400,000,000 highway appropriation provided by the National Industrial Recovery Act, an average of nearly $1,000,000 a calendar day had been put to work by the state highway departments in the construction of public-works highways. The improvement of more than 22,000 mi. of public roads and streets —a mileage sufficient to build a road almost around the world—will be the result of the expenditure.

The record of the road-building operation under the supervision of the Bureau of Public Roads showed on June 23, 1934, the following disposition of the $394,000,000 apportioned:

Status	Number of Projects	Public-Works Funds	Miles of Highways
Projects completed.	2,161	$ 66,040,000	6,360
Projects under construction	4,963	266,190,000	14,062
Projects awarded but not under construction	580	18,258,000	1,006
Total contracts awarded	7,704	$350,488,000	21,428
Projects approved but not under contract	394	15,440,000	871
Total obligated.	8,098	$365,928,000	22,299
Amount apportioned		$394,000,000	
Percentage of apportioned funds obligated to projects		92.9	

The task was complicated by the fact that new relationships between Federal and state highway authorities had to be established in municipal and secondary road construction. The preparation of programs by the various state highway departments also was necessary before construction could begin. In spite of the new relationships necessary, the state highway departments functioned smoothly and effectively in the $400,000,000 highway program, as had been expected by Federal authorities.

Of the part of the $394,000,000 fund available for roads on the Federal-aid highway system outside cities, 95.4 per cent. of the available money has been allotted to projects for improvement of 11,922 mi. of highways, of which 4,061 mi. was completed in the year. On extensions of the Federal-aid highway system into municipalities 89.3 per cent. of the funds has been obligated on 1,813 mi. of wide city streets with much complicated construction, of which 433 mi. has been completed. In the secondary-road program, involving improvement of rural roads not on the Federal-aid highway system, 92.3 per cent. of the funds available has been obligated for improvement of 8,564 mi. of highways of which 1,866 mi. was completed in the year.

Employment under the program totaled 246,192 men on June 23, 1934. This is only the direct employment on the roads and does not include the workers indirectly employed in quarries, mills, and factories and in the transportation of road materials, the number of which is estimated at nearly twice the direct employment.

The elimination of many traffic hazards is one of the chief results accomplished in the year's work. Hazards such as narrow roads and bridges and dangerous grade crossings at both railroads and highways have been reduced in number. Sidewalks have been provided to protect pedestrians on heavily-traveled highways. Every state is now making provision for roadside improvement to increase the attractiveness of the roads.

Indiana Plant Installs Fine-Crushing Equipment

★ For making sand out of larger gravel, for increasing the percentage of 100- and 200-mesh material in its present sand and for making broken stone out of various sizes of gravel J. C. O'Connor & Sons, Inc., Ft. Wayne, Ind., have purchased a new double-roll crusher. The machine, which is a 14-in. by 36-in. unit, was furnished by the F. M. Welch Engineering Service and will be used at the company's plant at Peru, Ind.

Russia's Largest Cement Plant Nears Completion

Construction work on the first section of the largest cement plant in the U. S. S. R., at Kamenskoe, in the Ukraine, was nearing completion toward the end of February, and the official opening was set for March 1. The capacity of the first section is 1,300,000 bbl. of Portland cement, and of the entire plant, when completed, 2,600,000 bbl.

Basalt Rock Co. Builds New Bituminizing Plant

★ The Basalt Rock Co., Inc., Napa, Cal., on June 19 put into operation a new aggregate bituminizing plant at its aggregate plant at Healdsburg, Cal. This plant is of the very latest type, with a capacity of over 1,000 tons daily and is equipped with dust collectors. Truck scales have also been installed. Most of the equipment was furnished by the Standard Steel Works, Los Angeles.

★ Two 15-ton Diesel-engine Caterpillar tractors have been purchased by the Mulberry, Fla., plant of the International Agricultural Corp., producer of phosphate rock. The machines were put in service in June.

Utah "Permissive" Area Proposed by Committee

THIRTY-FIVE PLANTS AFFECTED

Utah is the first state in Region 14, as set up by the fair-competition code of the crushed-stone, sand-and-gravel and slag industries, to establish "permissive" areas under the provisions covering the building of new plants. The Utah State Committee, of which Eric Ryberg is chairman, has surveyed the production facilities in the state and has set up the Salt Lake "permissive" area, which is described as follows:

This area includes no crushed-stone or slag plants, no portable-plant operators and the following sand-and-gravel producers (those registered being marked with an *):

North Boundary. — Beginning at the northeast corner, at the intersection of East Boundary on the section line and the North Boundary line of Salt Lake County, near the ¼ corner of Sec. 6 and 5, T 1 N-R 2 E, thence westerly along the county line to the intersection of the county line and the east-west section line near the corner of Sec. 2, 1, 12, 11, T 1 N-R 1 E, thence westerly along section line to the intersection of the county line at the corner of Sec. 4, 3, 10, 9, T 1 N-R 1 W, thence northerly along the county line to the intersection with the shore line of Great Salt Lake, thence westerly along that shore line to the intersection of the north-south section line through 72d Street West.

West Boundary.—From the ¼ corner of Sec. 33, 34, T 2 N-R 2 W, southerly along the section line along 72d Street West, inclusive, to the intersection with the south Salt Lake County line.

South Boundary.—From near the corner of Sec. 21, 22, 27, 28, T 4 S-R 2 W, easterly along the south the county line to the intersection with the north-south section line.

East Boundary.—From near the ¼ corner of Sec. 31, 32, T 3 S-R 2 E, northerly along the section line to the point of beginning.

COMMERCIAL PRODUCERS (25 plants)

*Bird Sand & Gravel Co.—3 plants.
Frank Burton—1 plant.
Forbush Sand & Gravel Co.—1 plant.
*W. H. Ford Trucking Co.—2 plants.
*Gibbons & Reed Co.—2 plants.
Green Sand & Gravel Co.—1 plant.
G. L. Hardman—1 plant.
*Ideal Sand Co.—1 plant.
Glen Jensen—1 plant.
Jones & Jackson Sand & Gravel Co.—1 plant.
Luker Sand & Gravel Co.—1 plant.
*Mellens Sand & Gravel Co.—1 plant.
*Salt Lake Valley Sand & Gravel Co.—1 plant.
*Stauffer Sand & Gravel Co.—2 plants.
Utah Copper Co.—1 plant (outside the area).
*Utah Sand & Gravel Producing Corp.—2 plants.
(There are 3 other plants, whose owners are not registered.)

NONCOMMERCIAL PRODUCERS (10 plants)

County Road Dept.—7 plants (1 outside the area).
State Road Commission—3 plants.

Proposals have already been made to extend the area's southern boundary one mile and to extend the northern boundary.

★ The Mario Pandolf Co., Sterling, Mass., recently installed a 10-in. by 36-in. New England Road Machinery Co. jaw crusher.

Low Bidders Must Get Future Awards: Ickes

LOCAL PREFERENCE RULE ENDED

Large sums of money will be saved taxpayers in the construction of future public works through an order issued by Harold L. Ickes, public works administrator, providing that all future non-Federal projects shall be awarded solely upon the basis of the lowest responsible bidders. The order rescinds former local-preference regulations covering the purchase of materials.

The decision was reached following a meeting of state engineers in Washington at which various state industrial organizations presented objections to Buy-at-Home policies inaugurated by the Public Works Administration as "not always in the interest of employment or economy." Exception was taken to a P.W.A. regulation for non-Federal jobs which required, where available, the use of materials produced where the job was located.

It was pointed out that there were many practical objections to these local preference regulations and particularly that they established a dangerous precedent that would create a new form of economic barrier at local and state boundary lines.

The rescinding order, signed by Harold L. Ickes, follows:

> Since the rule as to local preference for materials not only has worked hardship in many cases but also has frequently caused delay in the public-works construction program, Par. 9(b) Sec. C, Construction Regulations, Bull. No. 2, revised Mar. 3, 1934, and the memorandum to state engineers relating thereto dated Oct. 23, 1933, are hereby rescinded and the local preference for materials clause in all loan-and-grant and/or grant agreements now executed is hereby waived.
>
> As to construction contracts already let, the enforcement of the clause will be optional with the applicants. Except as otherwise provided by law, all future contracts will be awarded solely upon the basis of the lowest responsible bidder. Where prices, quality and quantity are the same, applicants may select any of the low bidders or may divide the orders as they desire.

It was argued that local preference regulations are unsound and harmful at all times, but are particularly injurious in a depression as they tend to prevent the normal flow of materials and services needed for business recovery. Now, if ever, each state should have opportunity to develop without being hampered by artificial barriers that create ill-feeling and prevent widespread distribution of its products.

New York to Make Survey of Highway Conditions

The New York state legislature has authorized the making of a survey of highway conditions in the state which can serve as a guide in determining its future highway policy. The resolution authorizing the survey was proposed by Senator George R. Fearon, Republican minority leader of the Senate.

The joint committee of the Senate and the Assembly, which will be formed to make the survey will be composed of 5 members of the Senate, 7 members of the Assembly, 3 citizens of the state (representing respectively the agricultural interests, the cities and the motor-vehicle owners), the state superintendent of public works and the state commissioner of highways. This committee is to investigate the engineering, economic and other phases of the highway-communication problem and will formulate a "complete highway and road-building policy for the state and its subdivisions and make recommendations as to the means of financing the same." The committee will also study such problems as "new locations for avoiding congested areas; the construction, reconstruction and regulation of public streets, highways, roads and footpaths in the state including a systematic all-year maintenance and snow-removal; a rational order of improving secondary roads and highways and township highways and their correlation with the highways on the primary state system," together with recommendations for traffic control and the like.

Concrete Producer Builds Sand and Gravel Plant

★ McElwee & Rogy, Peoria, Ill., have erected a new sand and gravel plant in that city, primarily for the purpose of supplying aggregates for the ready-mixed concrete operations of that company. The plant was designed by the Stephens-Adamson Mfg. Co., which furnished most of the equipment, including vibrating screens and conveyors. A Cedar Rapids jaw crusher is also used. The plant has a present capacity of 75 cu. yd. per hr.

Three Accident-Free Years Celebrated by Keystone

The Keystone Portland Cement Co., Bath, Pa., on June 6 celebrated the fact that the plant has had no lost-time accidents in three years. The meeting was presided over by Howard Leh, general manager of the company. Among the speakers was Edward C. Spring, a member of the board of the National Safety Council. Clarence F. Lerch is chairman of the safety committee of the plant and R. B. Hamilton is secretary.

★ Work has been started on the erection of new concrete storage silos at the plant of the Ash Grove Lime & Portland Cement Co., Chanute, Kans., according to reports from local newspapers. About 200 men will be employed in the construction work in addition to the 100 men now working in the plant.

Construction Contracts Move Up Again in May

TOTAL REACHES $134,445,700

Contracts let for all classes of construction during May in the 37 eastern states were 2 per cent. larger in dollar volume than the April total, according to F. W. Dodge Corp. At the same time the contract total of $134,445,700 was substantially above the contract total of $77,171,700 reported for May, 1933.

Privately-financed contracts amounted to $62,846, 500, which is the largest private-contract total since June of last year. It was 12 per cent. over April and 17 per cent. over May of last year. It should be noted that the May increase in privately-financed contracts was entirely due to the inclusion of one large new building project in connection with the development of Rockefeller Center, New York. During nine of the past 12 months private work has exceeded the amount for the corresponding month a year previous.

Publicly-financed contracts, *i.e.*, construction jobs undertaken chiefly with P.W.A. funds, totaled $71,599,200 for May. This was smaller by 8 per cent. than the total recorded for public contracts in April. With the exception of February of this year, the current total was the smallest monthly volume for this class of work reported since August, 1933. At the same time the May total for publicly-financed contracts was three times as large as that shown for May, 1933, before the advent of the current P.W.A. program.

May contracts for residential building alone totaled $24,847,200 as against $22,685,700 for April and $26,-519,700 for May, 1933.

For the elapsed months of 1934 construction awards of all descriptions in the 37 eastern states totaled $727,301,-000, as contrasted with $329,771,500 for the corresponding five months of 1933. Gains over 1933 for the current year to date were shown in each of the four major construction classifications: for residential building about 20 million dollars; for non-residential building about 100 millions; for public works almost 245 millions; and for public utilities more than 30 millions.

Contemplated construction reported during May for the 37 states east of the Rocky Mountains totaled $241,-271,200 as against $319,721,600 for April and $352,467,700 for May of last year.

General Crushed Stone Installing Asphalt Plant

★ The General Crushed Stone Co. is adding equipment to the Oaks Corners, N. Y., plant which will enable it to take care of orders for bituminous concrete. About four weeks will be required to make the installation.

Editorials

"This Is My Business!"

THE politico-economic events of the year just closed have brought the question of property ownership and the right of control based on possession into the conversations of the average man. What had been prior to the proposal and enactment of the National Industrial Recovery Act largely an academic question suddenly became a matter of general concern. Whereas the indicia of ownership in the legal sense had been looked upon as sufficient sanction for a policy of strict absolutism in the operation of business property, these were later to be subjected to closer examination in the course of which it appeared that there were other interests besides those of the legal owner. While it had been known that these other interests were greatly affected by the conduct of the business-owner, it was not so generally recognized that those interests could, should and did have an effect on him and his policies. The more deeply one looked into this socio-ethical phase of the problem, the more difficult it became to find any form of commercial activity that was not, to use the language of the courts, "affected with a public interest."

Commercial absolutism has been considered well-established chiefly because it was long-established; time had given sanction to what might not be so easily justified under later as under earlier conditions. In a system of crude barter and exchange, in which each man was more or less independent of another because he was in the largest sense of the word self-sustaining and therefore self-centered; whatever transactions occurred might reasonably be said to affect only the persons who were parties to them. But in our modern economy, in which few, if any men, are self-sustaining and in which the great majority of us depend, not only for the supplying of our wants but also for the purchase of the commodities or services which we have for sale, on many other persons scattered throughout the country and even perhaps the world, it is not so easy to make out a good case for commercial absolutism.

Whether the legal title to a business reside in an individual, a partnership, an association or a corporation, the right to control it absolutely, without regard to the rights of others, is under modern conditions really a myth. It is impossible for the owner of any business to conduct it in such a manner, and at the same time to continue to take a profit from it or to remain engaged in it. In former days, when the labor employed in a business was dependent on the continuance and success of that business for its very existence and when the customers of that business were dependent on the same conditions for the supply of their needs, its owner might reasonably consider himself in an impregnable position. He might pay his workers wages that were at or below the subsistence level and he might charge his customers prices that were based on the theory of charging all the traffic would bear. If he produced his own raw materials or furnished a product or rendered a service that was independent of raw-material or other sources of supply, his position as a commercial absolutist was greatly strengthened. The prevalence of this type of enterprise, even in the third quarter of the last century, has left its imprint on the thinking of most modern business men.

Every modern business is dependent for its existence as well as for its success on several other groups, without whose active and helpful coöperation it can not carry on. The sources of its materials offer the first check to the exercise of its absolutist tendencies. While these may compete with each other for its trade, they eventually—except in cases of great emergency, such as a business depression, when self-assertiveness exceeds the bounds of good sense—give it no more than they are constrained to give it, either by agreement or by the pressure of circumstances. Sources of material, machinery and power supply have been the forces from which the average business man has found it most difficult to escape.

THE workers who perform the acts of production and service involved in the conduct of his business offer the business man what is sometimes the greatest problem of all. Although they exist in normal times in sufficient number to bring their services to him at prices which he can easily afford to pay, they are always seeking to better their situations, either with him or elsewhere, and this establishes a tendency to raise the scale of wages for all classes of labor in all kinds of industry and at all places. While he always contrives to take back in the form of higher prices any increases in labor cost that may result, he would much prefer to add those increases to profits than to spread them in wages. Because his labor is directly employed in his plant and uses his machinery, it seems natural to him that he should be able to exercise more complete control over it than any of the other factors with which he is forced to reckon, and it is therefore in this direction that his tendency toward absolutism finds its most frequent and conspicuous expression. The fact that this control can never, under modern conditions, be made complete—due chiefly to the activities of labor organizations and the better understanding of industrial problems and industrial psychology which they have inculcated in the minds of workers—serves only to intensify his determination to master the situation at all costs.

Although no business can survive without customers, this group causes the average business man somewhat less concern than the others. Even where the number of customers is limited, either by the nature of his business or by the size of his marketing area, his attitude toward his customers is af-

fected more by the threats of his competitors than by any regard for the rights of buyers. To this extent, and perhaps only to this extent, can it be said that the consumer group exerts any material restraining influence on the despotic tendencies of the average business man.

To these natural and inescapable checks on his predatory ambitions has been added the threat of government regulation, made real in recent months by the provisions of the recovery act. Although the law has provided the sanctions and the machinery for self-regulation by industry itself, this arrangement has not completely disarmed criticism. The average business man still looks upon government regulation—whether this be exercised directly or, as is now the case, through policing by competitors supervised by the government—as an intrusion, as an infringement of his rights of property ownership, as an interference with his desire to manage his own affairs. "This is my business" has been the stereotyped answer of business men to the demands of labor for decades; it is the reply which many business men still consider a sufficient answer to the government's demand for adequate protection for those other interests—sources of supply, customers and competitors—who are greatly affected by, and therefore can not be indifferent to, the policies and conduct of business.

EVEN before the coming of the National Industrial Recovery Act, and even before the enactment of regulatory laws which preceded it, "This is my business" was an empty boast. To-day, in view of a more enlightened public opinion and the increasing pressure of the more effective controls mentioned, it is an idle protest. Yet, despite its futility, the phrase is still heard and even if these are not the exact words, they describe the sentiment expressed. In her recent book, *People at Work*, Secretary of Labor Perkins tells of an incident that occurred under the administration of the recovery act. An industrialist, sent to attempt a peaceful solution of a strike threat, was negotiating with the employer and the employees were about to vote. Suddenly the employer jumped to his feet and shouted: "But why should they vote? It's my factory, isn't it? I pay their wages, don't I? Why should they vote?"

Although dying, the spirit of absolutism in business is not yet dead. Although most business men recognize the natural and inevitable interest of workers, customers and competitors in the management of their enterprises and the complete dependence of their businesses upon the coöperation and support of all three elements, and are therefore willing to sacrifice something by way of concession, there still remain some who insist upon the make-or-break philosophy of the absolutist. Although most businesss men are sensible enough to welcome proffered help that is of more than momentary effect, a few can yet be heard crying "This is my business, and"—for good measure—"no one is going to tell me how to run it!"

Another Racket Ended?

THE diversion of gasoline and other motor-vehicle tax funds to uses other than those for which they were collected has been an insult to American honor. Until recently it seemed that a people which could protest loudly and in suitable language against the repudiation of war debts by foreign nations was unable to see the inconsistency of which they were guilty when they approved, silently if not expressly, the collecting of taxes for one purpose and the spending of them for another. Only a few were sufficiently shocked to cry out against this flagrant cheating of the American people, the forcible taking by law of money from the motor-owning public on the strength of a solemn promise to spend it for highway improvement and the subsequent deliberate seizing and spending of it for other purposes.

Many people appeased the weak protests of their consciences by explaining that the money so taken was to be expended in succoring the destitute, an end that every decent man will approve. What they failed or did not wish to see was the dishonesty which the process involved. Public charity is a public charge and can not properly, if we have any regard for the principle of fairness, be levied upon only one section of the population. What is more, if a promise embodied in the very law which authorizes the collection of a tax can be so easily flouted, what degree of confidence can a people have in its government or in the persons to whom it entrusts the administration of its affairs?

Had a single state been guilty of this breach of faith with its people, the crime would have been great enough. But, like all other errors, the first case led to others, until the readiness with which state after state embraced this easy but reprehensible method of finding funds for poor relief attained the proportions of a national disgrace. As such it deserved national attention and, we are happy to be able to say, received it. The Hayden-Cartwright bill, recently enacted by Congress and signed by the President, contains a section which, while it does not stigmatize the act of diversion, places the weight of Federal disapproval against it and fortifies this disapproval with a penalty. The act states:

> Since it is unfair and unjust to tax motor-vehicle transportation unless the proceeds of such taxation are applied to the construction, improvement, or maintenance of highways, after June 30, 1935, Federal aid for highway construction shall be extended only to those states that use at least the amounts now provided by law for such purposes in each state from state motor-vehicle registration fees, licenses, gasoline taxes, and other special taxes on motor-vehicle owners and operators of all kinds for the construction, improvement and maintenance of highways and administrative expenses in connection therewith, including the retirement of bonds for payment of which such revenues have been pledged, and for no other purposes. . . .

Legislatively speaking, "Everything comes to him who waits." It often happens, however, that the remedy is too long deferred. In this case the Federal government has taken a stand which every right-thinking citizen will approve and which, although late, has nevertheless come in time.

Trend Toward Special Cements Shown at A. S. T. M. Atlantic City Meeting

Lime, Gypsum, Concrete and Concrete Aggregates Also Subjects of Interest

THE 37th Annual Meeting of the American Society for Testing Materials was held June 25 to 29 at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. The meetings devoted to cement and its uses were unusually well attended by cement producers, chemists, engineers and others interested in the important developments now going on in this field.

The reports of the various committees were also presented at this meeting. The report of Committee C-1 on Cement was presented by P. H. Bates, chairman. An important question discussed in this report is the current interest in various types of hydraulic cements and the modification of the present standard Portland cement for use under different conditions. Two proposed new specifications presented at the March meeting of the committee—one covering a low heat of hardening cement and the other a cement to resist aggressive sulphate solutions—were referred to working committees for further studies. Data regarding the nature of and the development here and abroad in the making, using and past history of cements other than those made wholly from Portland-cement clinker are also being collected.

Appended to the report of Committee C-1 on cement are the following reports of working committees: *Report on Coöperative Sub-Sieve Fineness Tests by the Working Committee on Fineness* under the chairmanship of J. C. Pearson; *Report of Working Committee on Plastic-Mortar Tests for Portland Cement* under the chairmanship of O. L. Moore: *Report of Working Committee on Volume Change and Soundness of Portland Cement* under the chairmanship of H. F. Gonnerman; *Report of Subcommittee on Cement Reference Laboratory.* Other subcommittee reports not yet completed at the time of the meeting included those on methods of chemical analysis, time of setting, tentative specifications and tests for masonry cement, and tentative specifications for high-early-strength Portland cement.

At the meeting the Sponsoring Committee for Portland Cement under the Chairmanship of W. H. Klein, submitted Tentative Specifications for Sulphate-Resistant Portland Cement. It was voted to submit those proposed specifications to letter ballot of the Committee. If a favorable vote is received the specifications will then be submitted to Committee E-10 on Tentative Standards for adoption as a tentative standard.

It was also voted to submit the proposed Tentative Methods of Compressive Strength of Portland-Cement Mortars, as revised at the meeting, to letter ballot of the Society for adoption as a Tentative Standard.

Other reports presented were those of Committee C-7 on Lime, C-11 on Gypsum and C-9 on Concrete and Concrete Aggregates.

H. F. Gonnerman, manager of the Research Laboratory of the Portland Cement Assn., presented a paper on the *Study of Cement Composition in Relation to Strength, Length Changes, Resistance to Sulphate Waters, and to Freezing and Thawing, of Mortars and Concrete.*

This paper presents data obtained over a period of three years in an extensive coöperative investigation between the Research Laboratory of the Portland Cement Assn., Chicago, and the Portland Cement Assn. Fellowship at the Bureau of Standards, Washington, D. C.

One hundred and twenty-one laboratory-prepared Portland cements, covering 72 different compositions and ground to essentially the same fineness, were studied in relation to strength, length changes, resistant to sulphate waters and to freezing and thawing, in mortars and concrete. Supplementary data for several compositions covering the effect of variations in MgO content are included.

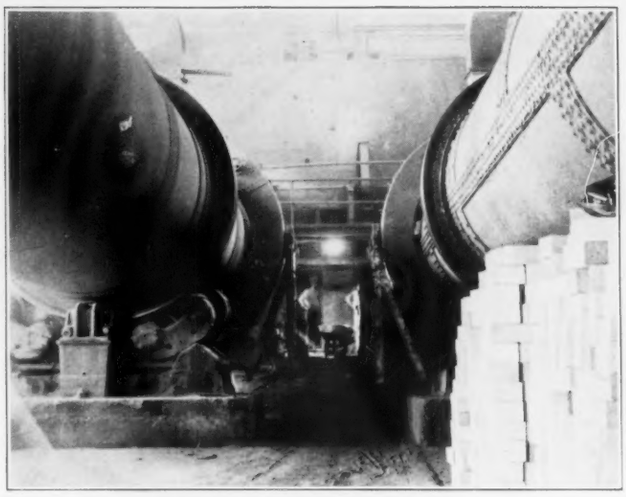
The results reveal that mortar and concrete properties are markedly influenced by the compound composition of the cement. The effects of each of the four major cement compounds on the various properties investigated are discussed.

The *Effect of Duration of Moist Curing on the Principal Properties of Concrete* was discussed in a paper by A. G. Timms, assistant manager of the Research Laboratory, Portland Cement Assn. The data presented covered strength tests at from 1 day to 2 yr. of 6-in. by 12-in. concrete cylinders moist-cured the entire time and part of the time; strength tests of 6-in. concrete cubes after different numbers of cycles of freezing and thawing; loss in weight of 6-in. concrete cubes subjected to freezing and thawing; tests of permeability by capillary flow; and volume change and absorption tests on 3-in. by 3-in. by 15-in. mortar bars. The tests are conducted with a normal Portland cement and two high-early-strength Portland cements.

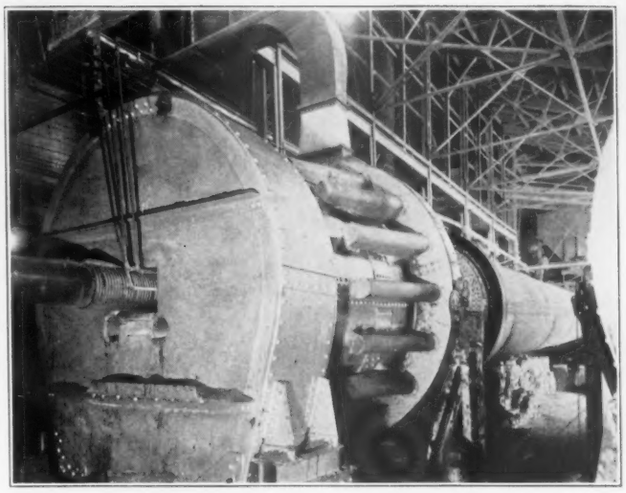
Following are the principal results:

1. Typical water-cement ratio-strength curves for moist-cured concrete were obtained regardless of the type of cement or test age. A significant feature of the strength tests was the smaller differences between the strength of moist-cured and air-

(Continued on page 44)



Firing ends of two kilns equipped with recuperators. Note poppet valves on wind-boxes which allow blast regulation when starting.



One of the recuperators with wind-box and duct to fan above. Note water-cooling pipe wound spirally around blast pipe.

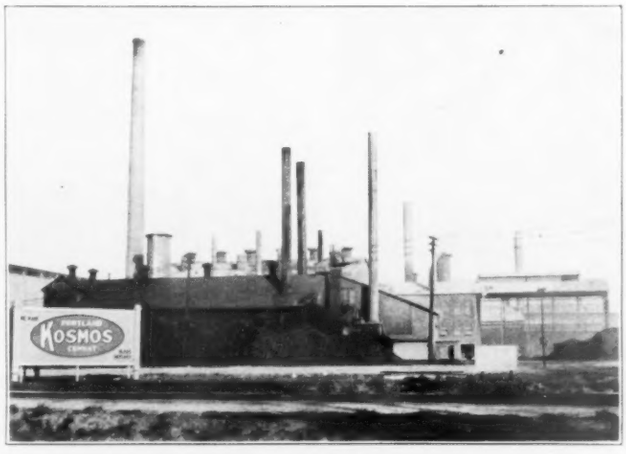
Recuperators on Cement Kilns Reduce Fuel Rate and Increase Capacity

Consistent Improvement Program Keeps Kosmos Portland-Cement Plant Modern

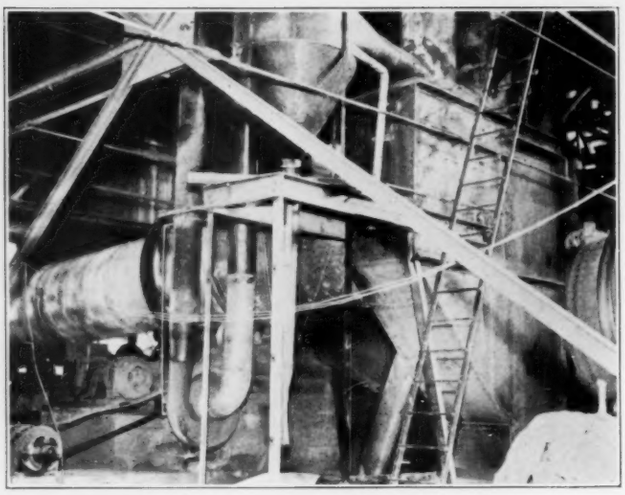
By W. E. TRAUFFER

A SINGLE, comparatively inexpensive improvement recently made in a cement plant has resulted in an 18-per cent. decrease in the kiln-fuel consumption and in an increase of 10 per cent. in the capacity of the kilns affected. Other benefits, in the form of a better quality of cement and an increase in waste-heat boiler-efficiency, have also been obtained. This installation has done for this plant what many other cement producers have tried to do with varying degrees of success in the past several years, when the reduction of production costs replaced increased plant capacity as the main objective of the industry.

This latest improvement in the plant of the Kosmos Portland Cement Co. at Kosmosdale, Ky., climaxed a long series of improvements which have kept this plant in step with the progress of cement - production practice. When the original plant was built in 1903 it had four 7-ft. by 6-ft. by 80-ft. kilns and what are said to have been the first waste-heat boilers to be used in an American cement plant. These boilers were designed for both hand and kiln firing. This plant had a capacity of 1,100 bbl. daily and when destroyed by fire in 1913 was completely rebuilt. Two 8-ft. 6-in. by 125-ft. kilns were added at that time and waste-heat boilers for these kilns were installed later. In 1924 new tube and Bradley mills were installed and in 1925 the steam engines in use were replaced with Allis-Chalmers turbine-generators, one of 2,500- and one of 2,000-kw. capacity. In 1926 the 300-ft. by 80-ft. clinker-storage building, which has a capacity of 250,000 bbl., was added. In 1927 a system of closed-circuit grinding was adopted in both the raw- and finish-grinding departments. In the same year the four original short kilns were lengthened to 100 ft. and a Fuller-Kinyon raw-material blending system was added. In 1932 powdered-coal-fired auxiliary boilers were purchased for use when the kilns are not running and early in 1934 Vanderwerp recuperators were installed on the two 125-ft. kilns. Truck haulage was adopted in the quarry in 1933 to replace the locomotives and cars formerly used. Hardinge feeders were installed to feed clay, stone, gypsum and cement in the plant and another is now being



Part of the plant of the Kosmos Portland Cement Co., Kosmosdale, Ky.



Rotary dust-collector unit installed on one of the rotary clinker coolers.

installed on the coal drier. This year a Roto-Clone dust collector made by the American Air Filter Co. was installed on one of the clinker coolers and another unit on hand will be put on the masonry-cement bag-packer. The chemical and physical-testing laboratories were rebuilt and enlarged last year. Other contemplated improvements include the installation of bag-type dust-collectors in the raw-grinding, finish-grinding and packing departments.

The limestone raw material is obtained from the company's quarry at Oölite, 30 mi. down the Ohio River west of Kosmosdale. The deposit is situated on the river bank and contains enough stone to supply the plant indefinitely. The limestone is overlaid with an average of 25 ft. of sandstone, part of which is removed by hydraulicking and the remainder by drilling with wagon-drills and blasting. The limestone is drilled with well-drills throughout the entire 160-ft. face and is blasted in the usual manner. The stone is loaded by a 3-cu.yd. Bucyrus 70C railroad-type steam shovel into 4 Mack trucks equipped with 8-ton Easton side-dump bodies.

The trucks haul the stone a distance of about 2,000 ft. to the crushing plant, where they discharge over a bar grizzly into a No. 12 Gates gyratory crusher. Belt conveyors carry the material either to a 5,000-ton stone storage or to barges. Stone can also be reclaimed by gravity from storage to the loading conveyors. Three 750-ton steel barges are used in this service and these are towed by the twin-screw tow-boat *Kosmos*, which is powered by two 150-hp. Fairbanks-Morse Diesel engines.

The barges are tied up at an unloading station near the cement plant. A stiff-leg derrick, handling a 3-cu.yd. clam-shell bucket, transfers the stone from the barges to a hopper. Mead-Morrison cable cars haul it a distance of ¼ mi. to a 10,000-ton storage-pile at the plant.

The crushing plant was originally steam-driven but in 1925 was electrified. The boilers now operate a 250-kw. Westinghouse turbine-generator.

Clay is obtained from a pit about 1 mi. from the plant. A steam shovel loads it into four White trucks having 7½-ton standard end-dump bodies and haul it to stock-piles at the plant.

Stone is reclaimed from storage by two tunnel conveyors feeding two rotary driers. Clay is fed by hand to a third tunnel conveyor which supplies the clay drier and is stored in two bins. The dried stone goes to a Williams hammer-mill for reduction and is stored in 6 bins.

Stone and clay are reclaimed from those bins and proportioned by three Hardinge constant-weight feeders which deliver them to a belt-conveyor that discharges into a Bradley Hercules mill for preliminary raw grinding. The raw material is then discharged to 8 small silos, where it is sampled and corrected as it enters. Rotary feeders under these silos discharge into a screw-conveyor and elevator feeding a bin over the one-compartment Allis-Chalmers 8-ft. by 35-ft. tube-mill. This mill is in closed-circuit with two 16-ft. Sturtevant mechanical air-separators from which the rejects are returned to the tube-mill feed.

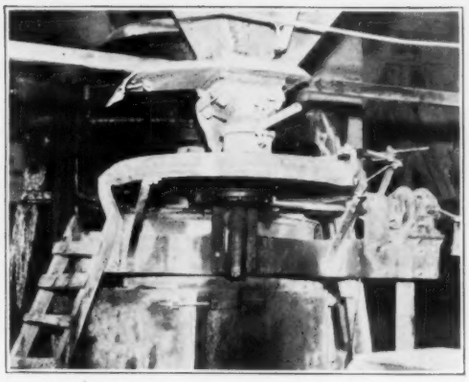
The fine material from the separators is transported by an 8-in. Fuller-Kinyon pump to the Fuller-Kinyon raw-material blending system. The pump feeds alternately to the four compartments of a steel blending tank having a total capacity of 10,000 bbl. A second 8-in. Fuller-Kinyon pump under these compartments draws from the bottom and returns the material to the compartments to give a further blending. A third pump of the same size feeds the finally blended material to the kiln-feed bins. The automatic control-board operating the blending system can be adjusted to any desired time interval, but is usually set at 2 min.

The raw mix is fed to the kilns from the kiln-feed tanks by screw-feeders. The four 7-ft. by 6-ft. by

Shovel loading into truck in cement-plant quarry 30 mi. from plant.

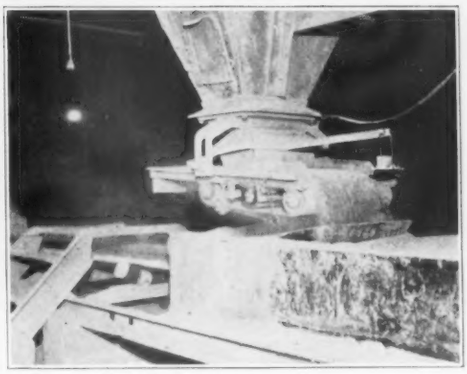
Barges of stone being unloaded at dock near cement plant.

System for loading stone into barges at cement-plant quarry.



Mill which does preliminary grinding of clinker with feeder above.

The preliminary raw-grinding mill.



Clay being measured and dropped on conveyor feeding raw-grinding mills.

80-ft. kilns discharge into 5-ft. by 40-ft. rotary coolers. The two 8½-ft. by 125-ft. kilns discharge into a single 6-ft. by 80-ft. rotary cooler. This in turn discharges the clinker, which now has a temperature of about 120 deg. F., to a rubber belt-conveyor leading to storage. The single cooler is unlined but is equipped with 8-in. lifters throughout. The kilns are fitted with induced-draft fans and waste-heat boilers.

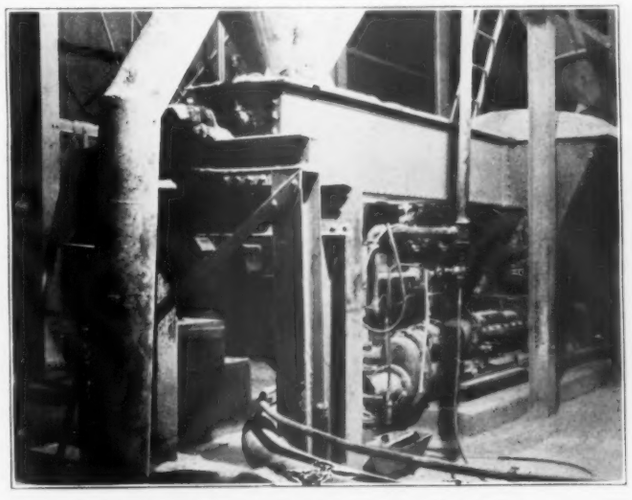
The Vanderwerp recuperators, which were installed on the two large kilns, have contributed considerably to the efficiency and operating economy of this plant. They are similar to those previously installed in several other plants, except that they embody a number of minor improvements. The principle on which the Vanderwerp recuperator operates is well known to the cement industry and its construction and operation have been so completely discussed in past issues of PIT AND QUARRY that no attempt will be made to describe it in detail in this article. Briefly, the recuperator forms an integral part of the kiln and consists essentially of an annular wind-box of welded steel-plate construction surrounding the kiln at its discharge end and supplying a predetermined volume of air under pressure to the kiln. Suitable blast connections, terminating in heat-resisting metal lining-plates with air-discharge orifices replace the usual refractory lining in the end of the kiln adjacent to the firing hood. Poppet valves on the wind-box allow air to escape around the full circle of the kiln when desired. By relieving the intensity of the blast through the clinker these valves prevent a dust fog due to unburned raw mix on the plates when starting the kiln. As soon as the operating temperature is reached these valves are closed and the entire air blast goes through the clinker.

As a result of the installation of these two Vanderwerp recuperators the two kilns so equipped are now producing 42 bbl. of clinker per kiln-hr. This represents a 10-per cent. increase over their former capacity. A coal saving of about 20 lb. per bbl. has been effected, bringing the present fuel consumption down to about 85 lb. per bbl. The coal being used has a fuel value of 13,500 to 14,000 B.t.u. as fired. The figures on coal consumption are as accurate as can be estimated by the calibration of the coal-feed screws and other similar methods. More accurate figures will be available when the actual amount of coal consumed over a longer period can be accurately determined.

Other results obtained from the installation of these recuperators include a reduction in the temperature of the clinker discharged from the kilns from the former level of 2,000 deg. F. to 750 to 800 deg. F. The preheat of the kiln combustion air is also estimated at about 1,000 deg. F. The exit gas temperatures range from 1,400 to 1,600 deg. F. and are now about 200 deg. higher than formerly. In this plant this is an advantage, as it enables the waste-heat boilers to produce a larger proportion of the power required to operate the plant and reduces the fuel consumption of the stand-by boilers which furnish the remainder of the power requirements.

This plant produces four distinct types of cement: standard Portland, high-early strength, masonry, and a special cement for lock construction under T. V. A. specifications. This latter type must meet standard A. S. T. M. specifications with a fineness limitation of not more than 85 per cent. passing the 200-mesh sieve. The highly flexible and efficient raw- and finish-grinding systems allow a quick change to be made from one to any other of these cements. It is interesting to note that high-early-strength clinker is now being produced only in the two kilns equipped with recuperators and that it is isolated in the storage for this purpose.

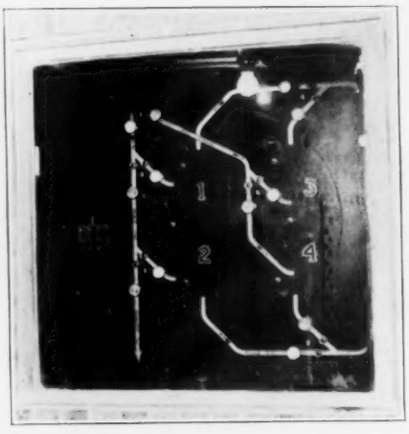
Tests have shown that, although standard cement



Pump which handles pulverized raw material from separators to raw-blending system.

Truck discharging bulk cement to storage and loading system for barge shipments.

clinker produced in the Vanderwerp-equipped kilns contains some free lime, the quantity is much less than that in the clinker from the other kilns. Repeated tests of Vanderwerp high-early-strength clinker show no free lime. A representative sample from a considerable amount of this cement gave 24-hr. breaks of 320 lb. and 3-day breaks of 415 lb. A comparison with the other clinker shows the almost complete absence of dust. This is said to be partly due to proper burning of the clinker and to the fact that most of the dust in the clinker is carried back in the kiln by the air currents and recombined with the feed. There is no interference with visibility in the kiln.



Illuminated board which shows operation of automatic raw-material blending system.

An interesting development on the kilns, worked out by A. C. Brown, plant manager, is the water cooling of the kiln blast-pipes. These pipes extend into the kilns to a point 18 in. short of the metal recuperator lining. Each pipe is 9 in. in inside diameter and is surrounded by a 12-in. outer jacket carrying the primary air. This arrangement allows regulation of the primary air without disturbing the blast velocity. Cooling-water pipe of ¾-in. diameter is wrapped spirally around the outer pipe in three sections. The first section from the end of the blast pipe is 18 in. long, the second 24 in., and the third 36 in. Each is fed cooling water separately at a temperature of 50 deg. F. The return water temperature is only 100 deg. F. in the hot-end section and 77 deg. in the other two. A total of only 25 gal. per min. of cooling water is used. Because of these low temperatures, no lime deposits form to clog the pipe.

A P & H 80-ft. span overhead electric crane, fitted with a 3-cu.yd. clam-shell bucket, handles the clinker and gypsum from storage to bins. Two Hardinge feeders under these bins proportion these materials, which are then elevated to the Bradley mill-feed bin. An elevator and screw-conveyor feed the 8-ft. by 35-ft. Allis-Chalmers 2-compartment mill which can be operated in open- or closed-circuit as desired with two 16-ft. Sturtevant separators.

The finished cement is carried by a series of screw-conveyors and elevators to a cement stock-house having a capacity of 150,000 bbl. Cement is reclaimed from storage by screw-conveyors, which discharge it to elevators feeding the bins over the four 4-tube Bates packers in the pack-house. Car shipments of bulk and bagged cement are made from this point.

River shipments of cement, which at present represent about half the total shipments, are made from a loading terminal on the river bank ½ mi. from the plant. The bulk cement is loaded at the plant in special tank trucks. These dump at the terminal through a hopper into a 6-in. Fuller-Kinyon pump. This conveys the cement either to two 5,000-bbl. concrete silos or direct to the packing dock, where the cement can be either sacked by four bag-packers or loaded into barges in bulk. The same pump also feeds from the silos to the dock.

The coal-mill building which supplies the pulverized fuel for the kilns, driers, waste-heat boilers, etc., houses three 42-in. Fuller mills and a 6-ft. by 60-ft. rotary drier. Coal is unloaded from cars into the mill by a locomotive crane.

In addition to the barges and tow-boat used to haul stone to the plant, the company also operates a subsidiary known as the Kosmos Towing Co. Gasoline, coal, oil, cement and iron are hauled to points between Pittsburgh, Pa., and Cairo, Ill., on Ohio River and on the Green and Kentucky Rivers. Four tugboats and 32 steel barges from 400- to 1,000-ton capacity are used in this service.

One of the special trucks used to haul bulk cement from plant to barge-loading terminal.

Airplane view of the plant of the Kaiser Paving Co. near Livermore, Cal.

The Nonmetallic Minerals of California*

By WALTER W. BRADLEY

State Mineralogist, Division of Mines

THE most important developments quantitatively in California's feldspar resources have thus far taken place in San Diego and Riverside Counties. Other deposits which give promise are reported from Inyo, Kern, Plumas, and San Bernardino Counties. Some production has also come from Monterey and Tulare Counties. It is being used principally in the ceramic industry.

Fluorspar.—Deposits have been reported in Los Angeles, Mono, Riverside, and San Bernardino Counties, but no commercial production has thus far resulted except in 1917-1918, when a small tonnage was shipped from Riverside County. The San Bernardino deposits particularly seem to offer possibilities for commercial tonnages.

Fullers' Earth.—Fullers' earth includes many kinds of unctuous clays. It is usually soft, friable, earthy, nonplastic, white and gray to dark green in color and some varieties disintegrate in water. In California fullers' earth has been used in clarifying both refined mineral and vegetable oils and for special chemical purposes. Production has come mainly from Calaveras and Solano Counties, with other deposits noted also in Riverside, Fresno, Inyo, and Kern Counties.

Clays of the montmorillonite and halloysite or bentonite group ("rock soap") are being utilized by some of the oil refineries in lieu of true fullers' earth in the refining of petroleum products. Such production has come from Inyo, Kern, San Bernardino, and San Diego Counties.

After all, the practical test of a fullers' earth is not so much chemical as a physical one; that is, its physical capacity to absorb basic colors and to remove these colors from solution in animal, vegetable, or mineral oils, also from water.

Gypsum.—The important commercial production of gypsum in California at the present time is from Imperial and Riverside Counties. In the past shipments have also been made from San Benito, San Bernardino, and Fresno Counties. The Pacific Portland Cement Co. and the U. S. Gypsum Co. are the largest operators.

The plant of the former is at Plaster City on the

* *Continued from the May issue.*

General view of the Hoover Dam plant of Six Companies, Inc., with gravel storage-piles, stock-piling conveyors, stone ladders, and reclaiming conveyors clearly shown. Substation in right foreground.

San Diego and Arizona R. R. in Imperial County, and the mineral holdings comprise 1,200 acres in the Fish Mountains, 26 mi. northeast from the plant, the two being connected by the company's own railroad. The gypsum occurs in a deposit about 3 mi. in length from southeast to northwest, and ¾ to 1 mi. in width, with an average thickness of over 150 ft. The beds dip 15 to 25 deg. west, and the grade is stated to be remarkably uniform, averaging 95 per cent. calcium sulphate. The broken material is loaded by steam-shovel into 30-ton steel side-dump cars, then hauled in trains having as many as 18 cars by locomotive to the plant at Plaster City.

The plant of the U. S. Gypsum Co. is at Midland, Riverside County, the deposits being in the Little Maria Mountains, 2 mi. west from the Santa Fe Ry.'s branch line running between Rice and Ripley. The gypsum is white, crystalline, compact and of high quality. Both open-cut quarrying with Diesel-engine-shovel loading and underground stoping combined with glory-holing have been utilized.

Lepidolite.—The lithium mica, lepidolite, utilized in the manufacture of artificial mineral water, fireworks and glass, has been mined from time to time since 1899 in San Diego County. Small amounts of amblygonite, a lithium phosphate, have occasionally also been obtained from pockets associated with the gem tourmalines.

Limestone and Marl.—Limestone is widely distributed throughout California, and there are a number of plants which calcine the rock, producing lime which is utilized for structural purposes. The quality is excellent, and the sources economically near the principal population centers, both north and south. Under the "industrial" heading is included the stone utilized as smelter and foundry flux and for glass and sugar processes. It also includes that utilized for fertilizers (agricultural "lime"), "roofing gravel," paint and concrete filler, whiting for paint, putty, kalsomine, terrazzo, paving dust, chicken grit, carbon dioxide gas, "paving compound," facing dust for concrete pipe, also for rubber and magnesite mix. Calcareous marl sold for agricultural purposes is likewise classified under this designation in the statistical reports of the division of mines. Limestone used in the manufacture of cement is not here included, nor that for macadam and concrete.

Although limestone is of widespread occurrence in California, commercial development is dependent principally upon the economic factor of convenience to cheap transportation, as well as upon the chemical analysis and the size of the deposit. The principal production in recent years has come from El Dorado, Kern, San Bernardino, Santa Cruz, Shasta, Tulare, and Tuolumne Counties.

The usual quarry methods, either open-cut bench or glory-hole, are employed, with the exception of the El Dorado Lime & Minerals Co. near Shingle Springs in El Dorado County. This deposit consists of a series of lenses of white and very high-grade limestone which dips 85 deg. east. The limestone is solid, without gouges on the walls, and stands well without timber. A total length of over 300 ft. along the strike and a width of 115 to 120 ft. has been opened, but the probable extent of the deposit is not known definitely as it does not outcrop conspicuously and has not been prospected elsewhere. Because of its purity and whiteness, the stone is in demand for numerous uses. The plant has a capacity of 100 tons per day.

Magnesite.—Most of California's magnesite is comparatively pure, and is ordinarily a beautiful, white, fine-grained rock, with a conchoidal fracture resembling a break in porcelain. Because of its purity and color it is particularly suitable for plastic purposes. For refractory purposes a small

percentage of iron is desirable. Some refractory magnesite has been marketed from California deposits, notably in Napa, San Benito, and Tulare Counties. Santa Clara, Stanislaus, and Tulare Counties have been the more important producers of plastic magnesite. In the past Sonoma, Napa, Kern, San Benito, and Tuolumne Counties have also contributed.

Mica.—Except for a small tonnage shipped in the years 1902 to 1904 inclusive, there has been no commercial yield of mica reported in California, mainly due to lack of the development of suitably-sized material for electrical appliances. Mica schist is being shipped occasionally for various purposes including ceramics, roofing and stucco granules, and for foundry facings.

Paint Pigments.—Mineral paint pigments produced in California have included hematite, red ocher, and yellow ocher. Stanislaus, Placer, Calaveras, and Sonoma Counties have been the principal contributors, with small, occasional amounts for a number of other localities.

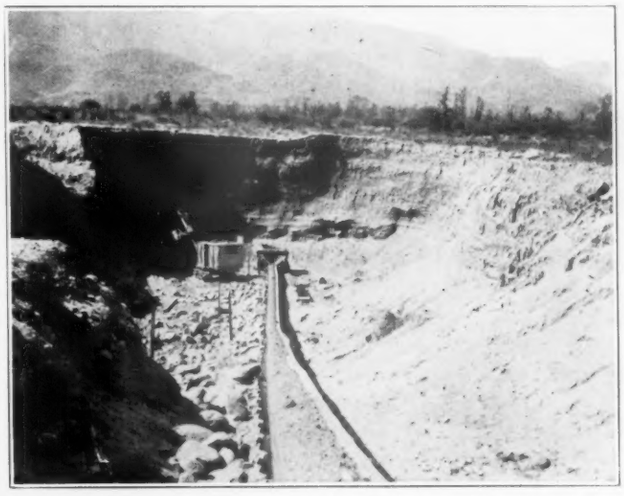
Pumice and Volcanic Ash.—Both the block and ash varieties of pumice are found and produced commercially in California, principally in Imperial, Inyo, Fresno, Kern, and Mono Counties. There have also been shipments from Humboldt, San Francisco, San Luis Obispo, San Bernardino, and

Shovel, field hopper and conveyor system in the Irwindale pit of the Consolidated Rock Products Co.

Shasta Counties. The material from Imperial County and part of that from Mono is of the vesicular, block variety and is sold for abrasive purposes. There are also deposits of similar high-grade pumice in Siskiyou County. The balance of the Mono material and that from Inyo, Fresno, and Kern Counties is the volcanic ash or tuffa variety and is employed in making soap and cleanser compounds, also as a concrete filler in cement displacement. The Kern County ash is going into the preparation of one of the popular and nationally advertised brands of cleanser compounds.

Silica—Sand and Quartz.—These materials are combined in statistical reports of the Division of Mines, because of the overlapping roles of vein quartz which is mined for use in glassmaking and as an abrasive, and that of silica sand which, although mainly utilized in glass manufacture, also serves as an abrasive. Both varieties are also utilized to some extent in fire-brick manufacture.

A portion of the tonnage of vein quartz in California in 1916 and 1917 was employed in the preparation of ferro-silicon by the electric furnace. At present some is utilized as a foundry flux and for steel-casting molds. A portion of the silica (both sand and quartz) sold is also used in glazes for porcelain, pottery and tile, and in the body of the ware



Shovel, field hopper and conveyor in the pit of the Piru Rock Co., Piru, Cal.

to diminish shrinkage, and some of the sand for the preparation of sodium silicate ("water glass"). Manufacturers of paint use finely-ground silica, which forms as much as one-third of the total pigment in some points. Part of the recent output in California was used for roofing and stucco-dash granules.

Not included under this heading are such forms as quartzite, sandstone, flint, tripoli, diatomaceous earth, and the gem forms of "rock crystal," amethyst, and opal. Each of these has various industrial uses. For making the higher grades of glass most of the sand used locally is imported from Belgium. There are various deposits of quartz in California which could be utilized for glass making, but they have not been so used, owing to the cost of grinding and the difficulty of preventing contamination by iron while grinding.

Silica sand has been produced in the following counties of the state: Alameda, Amador, Contra Costa, El Dorado, Imperial, Los Angeles, Mono, Monterey and San Diego. The industry is of limited importance so far, because of the fact that much of the available material is not of a grade which will produce first-class colorless glass. For such purposes it must be essentially iron-free, for even a fractional percentage of iron imparts a green color to the glass. Belgian sand has also displaced local material in the manufacture of sodium silicate ("water glass").

Soapstone and Talc.—Foreign importations of

high-grade white talc suitable for the manufacture of toilet powder have come mainly from Canada, Italy and France. Foreign producers have the benefit of cheap labor and a low tariff import duty. In addition to these disadvantages, California operators must contend with transcontinental freight rates to the eastern manufacturing centers. It is reported that California talc has in part replaced imported talc in the toilet trade on the basis of quality. The largest production of talc in the United States comes from Vermont and New York, and of massive soapstone from Virginia.

Nearly 80 per cent. of the product in California is high-grade talc, mainly from Inyo and San Bernardino Counties, and is utilized mostly in toilet powders, paints, paper and rubber manufacture, and also in ceramics and for polishing rice. The soapstone grades are being used mainly for roofing granules and as a filler in roofing paper, and part also in magnesite-cement mixtures. Some of the El Dorado County mineral, a steatite variety, has been used in electrical insulators.

Sulphur.—Sulphur was produced in California at the famous Sulphur Bank mine in Lake County during the years 1865 to 1868, inclusive, following which the property became more valuable for its quicksilver. The Elgin quicksilver mine near Wilbur Springs, Colusa County, also has a considerable body of native sulphur available. In 1923-1924 there was a small production from a deposit in Kern County and in 1929 a similar yield from Colusa, the material being ground and utilized as a fertilizer and in dusting for mildew. In addition to these, occurrences of sulphur have been noted in Imperial, Inyo, Sonoma, Tehama, and Ventura Counties.

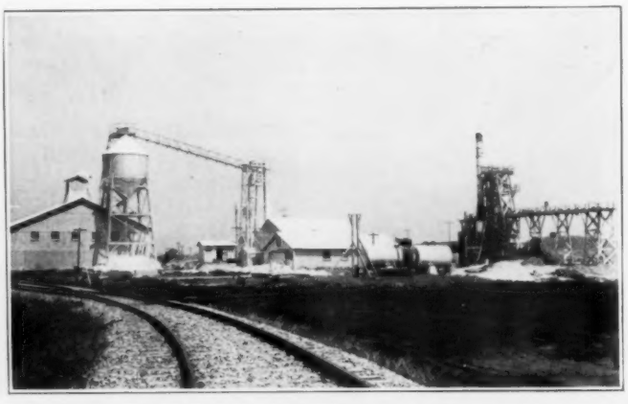
Salines.—The saline group includes the borates, common salt, soda, potash, magnesium chloride and sulphate, calcium chloride, and bromine. There has been as yet no commercial production of the nitrates in California. Borax and common salt have been produced in a number of localities here more or less regularly since the early 'sixties, either soda ash or salt cake since 1894, and the others in more recent years. Bromine recovery began in 1926.

Borates.—Borax was first discovered in California in the waters of Tuscan Springs, in Tehuma County, in January, 1856. Borax Lake in Lake County was discovered in September of the same year by Dr. John A. Veatch. This deposit was worked in 1864 to 1868, inclusive, and during that time produced 1,181,365 lb. of refined borax, the bulk of which was exported by sea to New York. This was the first commercial output of this salt in the United States, and California is still the leading American producer of borax, having been for many years the sole producer.

Production from the dry lake "playa" deposits of Inyo and San Bernardino Counties began in 1873; but it was not until 1887 that the borax industry was revolutionized by the discovery of the colemanite beds at Calico in San Bernardino County. These have since been largely worked out, and the output for a number of years came from similar beds in Inyo and Los Angeles Counties. The colemanite deposits of Ventura County are as yet unworked, owing to lack of transportation facilities.

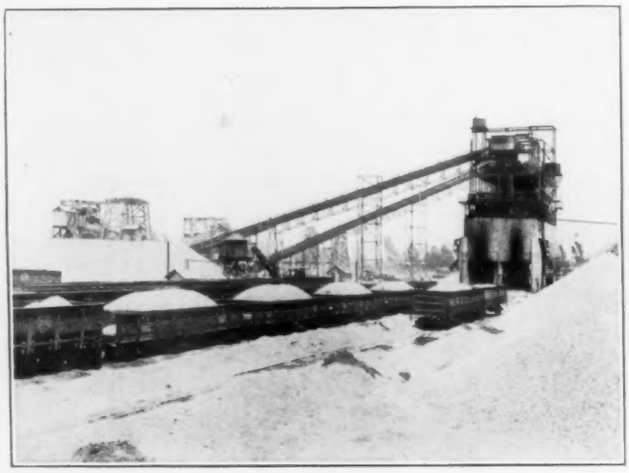
Colemanite is a calcium borate, and the material mined was shipped to seaboard chemical plants for refining. The latest development in the borax industry is the discovery in quantity of a new borate mineral which has supplanted colemanite in much the same way that the colemanite deposits displaced

(Continued on page 44)



Newark, Cal., plant of the California Chemical Corp. which makes lime from oyster shell.

Gravel plant of the Kaiser Paving Co. near Livermore, Cal.



Gravel plant of the Consolidated Rock Products Co. at Irwindale.

P. W. A. in Its First Half-Year Spends $6,781,992 for Nonmetallics

All Materials Bought for Public-Roads Projects Total $56,239,535

IN the first six months of actual construction of public-works projects under the Public Works Administration a total of $271,516,697 was spent for labor and materials. The sum expended for labor, $82,646,630, gave employment to an average of 250,282 workers each month. These wage earners worked 157,881,721 man-hr., for which they received an average of 52.3c. an hr. In October of 1933 only 114,098 workers were employed and their earnings were only $7,006,680, but in each of the succeeding five months—November to March inclusive—the number of workers exceeded 250,000 and their earnings $14,000,000. The month-by-month record is given in Table I.

During the first five months of the half-year period the value of orders placed for materials exceeded $22,000,000 monthly and amounted in the entire six months to $188,870,067. Of the $69,334,754 spent in March of this year $24,219,346 represented purchase orders placed by railroads for new equipment. Eliminating this exceptional item from the March total leaves a "peak" materials expenditure of $45,115,408, which is nearly double the previous 5-month average.

Public-works allotments are divided into two groups: Federal and non-Federal. Federal allotments are awarded to departments of the Federal government. Federal projects are wholly financed by the Public Works Administration and are built either by force account—that is, by day labor hired directly by the government supervising the construction—or by contract—that is, awards made to commercial firms by the Federal agency.

Non-Federal allotments, when awarded to a state or political subdivision thereof, are financed partly by the P. W. A. and partly by the local authorities. Usually the P. W. A. makes a grant of 30 per cent. of the total cost and in many cases will lend the remaining 70 per cent. Where non-Federal allotments are made to commercial firms, such as the railroads referred to above, they are loans only and must be repaid within a certain designated period of time. Projects under both types of construction are supervised by representatives of the Federal government.

From Table II it is apparent that public roads, exclusive of the work done by the Bureau of Public Roads, formed the largest single item, both in employment provided and materials purchased, among

Table I—EMPLOYMENT, PAY-ROLLS, MAN-HOURS WORKED, HOURLY EARNINGS AND MATERIALS PURCHASED ON PROJECTS FINANCED FROM PUBLIC-WORKS FUNDS, BY MONTHS[1]

Month	Number of Wage Earners	Amount of Pay-Rolls	Number of Man-Hours Worked	Average Earnings Per Hour	Value of Material Orders Placed
1933					
October	114,098	$ 7,006,680	14,077,752	49.8c.	$22,005,920
November	254,784	14,458,364	28,168,280	51.3c.	24,605,055
December	270,808	15,224,700	29,866,297	52.7c.	24,839,098
1934					
January	273,583	14,574,960	27,659,581	52.7c.	23,522,929
February	295,722	15,245,381	28,938,177	52.7c.	24,562,311
March	292,696	15,636,545	29,171,634	53.6c.	69,334,754[2]
Totals or averages	250,282	$82,646,630	157,881,721	52.3c.	$188,870,067

[1] All figures subject to revision.
[2] Includes $24,219,346 for new railroad equipment.

Table II—EMPLOYMENT, PAY-ROLLS, MAN-HOURS WORKED, HOURLY EARNINGS AND MATERIALS PURCHASED FOR FEDERAL AND NON-FEDERAL PROJECTS IN MARCH, 1934, BY TYPE OF PROJECT

Type of Project	Federal					Non-Federal				
	Number of Wage Earners	Amount of Pay-Rolls	Number of Man-Hours Worked	Average Earnings Per Hour	Value of Material Orders Placed	Number of Wage Earners	Amount of Pay-Rolls	Number of Man-Hours Worked	Average Earnings Per Hour	Value of Material Orders Placed
Building construction	19,780	$ 936,517	1,334,253	70.2c.	$1,850,894	6,190	$331,310	393,563	84.2c.	$ 863,651
Forestry	14,827	821,986	1,432,445	57.4c.	581,303					
Naval vessels	7,417	743,933	991,713	75.0c.	7,107,190					
Public roads	141,243	7,502,577	16,019,921	46.8c.	7,400,000					
Reclamation	9,979	1,060,241	1,551,763	68.3c.	1,081,873					
Railroad construction						7,036	205,290	416,935	49.2c.	10,641,301
Railroad equipment[1]						12,689	710,001	1,156,999	61.4c.	7,506,559
River, harbor and flood control	35,047	1,737,216	2,971,111	58.5c.	3,261,860					
Streets and roads[2]	9,571	316,081	718,518	44.0c.	255,862	4,081	111,538	182,628	61.1c.	89,916
Water and sewerage	1,072	47,355	75,031	63.1c.	54,692	7,376	363,334	578,919	62.8c.	963,733
Miscellaneous	15,962	724,221	1,307,576	55.4c.	3,355,611	426	24,945	40,259	62.0c.	100,963
Totals or averages	254,898	$13,890,127	26,402,331	52.6c.	$21,949,285	37,798	$1,746,448	2,769,303	63.0c.	$20,166,123
Totals, Federal and Non-Federal						292,696	$15,636,845	29,171,634	53.6c.	$45,115,408

[1] Building and repairing cars and locomotives in railroad shops.
[2] Other than those reported by the Bureau of Public Roads.

Table III—EMPLOYMENT, PAY-ROLLS, MAN-HOURS WORKED, HOURLY EARNINGS AND MATERIALS PURCHASED FOR FEDERAL AND NON-FEDERAL PROJECTS IN MARCH, 1934, BY GEOGRAPHICAL DIVISIONS

Geographic Division	Federal					Non-Federal				
	Number of Wage Earners	Amount of Pay-Rolls	Number of Man-Hours Worked	Average Earnings Per Hour	Value of Material Orders Placed	Number of Wage Earners	Amount of Pay-Rolls	Number of Man-Hours Worked	Average Earnings Per Hour	Value of Material Orders Placed
New England	7,274	$ 487,489	723,803	67.4c.	$ 896,088	2,846	$ 199,748	320,039	62.4c.	$ 444,102
Middle Atlantic	11,482	721,861	1,164,004	62.0c.	6,628,110	4,612	237,917	391,317	60.8c.	9,339,683
East North Central	15,486	849,835	1,378,433	61.7c.	1,062,080	7,499	358,912	456,970	78.5c.	3,663,069
West North Central[2]	38,766	1,812,661	3,727,984	48.6c.	1,163,157	2,882[2]	101,493[2]	146,249[2]	69.4c.[2]	887,906[2]
South Atlantic	37,791	1,964,906	4,079,391	48.2c.	2,357,320	4,691	248,502	414,323	59.9c.	1,739,085
East South Central	26,998	1,342,005	2,922,844	45.9c.	1,176,712	1,154	37,990	64,655	58.7c.	39,558[5]
West South Central	62,006	2,558,156	5,934,556	43.1c.	893,509	3,365	168,904	289,495	59.3c.	992,233
Mountain	27,863	2,227,485	3,536,540	63.0c.	974,752	2,261	62,890	112,515	55.8c.	613,397
Pacific	23,164	1,724,376	2,513,791	68.6c.	1,222,068	7,956	315,605	550,727	57.3c.	1,887,610
Total, U. S.[3]	250,897	$13,695,657	25,990,499	52.7c.	$23,773,827[4]	37,533	$ 1,735,691	2,752,574	63.0c.	$20,136,430
Outside U. S.	4,001	194,470	411,832	47.2c.	1,175,458	265	10,727	16,729	64.1c.	29,693
Grand total	254,898	$13,890,127	26,402,331	52.6c.	$24,949,285	37,798	$ 1,746,418	2,769,303	63.0c.	$20,166,123
Totals, Federal and Non-Federal						292,696	$15,636,545	29,171,634	53.6c.	$45,115,408

[1]Includes work done in railroad shops and shown as "Railroad equipment" in Table II.
[2]No railroad shop work done in this division.
[3]Includes data for 67 workers not chargeable to any specific division.
[4]Includes $7,400,000 estimated value of materials purchased for public-roads projects which can not be distributed by divisions.
[5]No railroad-shop material purchases reported.

the eight types of project listed there for March. In that month public-roads projects employed 141,243 men, or 55 per cent. of the total, and required the purchase of $7,400,000 worth of materials, or nearly 30 per cent. of the total. Among non-Federal projects water and sewerage developments led in the number of men employed (7,376) and railroad construction stood first in the expenditures for materials ($10,641,301).

The total material purchases for both Federal and non-Federal projects during March were $45,115,408. Total pay-rolls amounted to $15,636,545, which was paid to 292,696 wage earners who worked 29,171,634 man-hr.

Unfortunately no data showing the distribution of material purchases made on account of public-roads projects by kind of material are available. Therefore, only total figures can be given. In March public-roads material purchases amounted to $7,400,000 and during the preceding five months—October to February inclusive—to $48,839,535. The six-month total is $56,239,535 (Table IV).

There is no necessary or fixed relation between the sums spent for materials and those spent for labor, since many material orders are placed for future delivery. There is, therefore, no significance in the fact, for example, that public-roads material purchases ($7,400,000) amounted to somewhat less than the sum spent for labor ($7,502,577), while in the case of other public-works projects, Federal and non-Federal, the cost of the materials purchased ($37,715,408) was more than 4½ times that of labor ($8,133,968). It will be remembered, too, that the sum appropriated for projects other than roads—$3,300,000,000 less the $400,000,000 allotted to road work—is more than seven times the minimum amount set aside for roads. The road projects include much work on secondary roads and much grading and maintenance, in which labor forms a much greater share of the total cost than materials.

In Table III is shown the geographical distribution of the expenditures given in Table II. The non-Federal figures include the railroad-shop work shown in Table II as "Railroad equipment." This is not of sufficient interest to warrant separate geographic tabulation, especially as the totals are shown in Table II.

Detailed figures showing the amounts spent in the six months ended March 15 for various types of materials, machinery and supplies on account of public-works projects other than roads are given in Table IV. Of a total of $132,640,532 spent for all materials, $12,171,086, or nearly 10 per cent., went for nonmetallic minerals and their products. The largest single item in this group of materials comprised marble, granite, slate and other stone products, for which $3,247,908 was spent. The second largest sum, $2,647,865, was spent for concrete products. Cement ranked third with a cost of $1,986,284, sand and gravel fifth with a cost of $1,247,095, and crushed stone eighth with a cost of $261,830. The fourth position was occupied by clay products ($1,269,144) and the sixth and seventh positions respectively by "paving materials and mixtures" ($743,393) and "roofing, asphalt shingles and roof coatings other than paint" ($450,154).

For metals and metal products, including fifteen items, $58,553,840 was spent in the half-year, or 44.15 per cent. of the total. Machinery and apparatus valued at $45,212,733, or 34.09 per cent. of the total, was purchased, lumber and timber products purchases amounted to $9,113,787 (6.88 per cent. of the total) and fuels and lubricants to $1,049,138 (less than 1 per cent. of the total. Materials not otherwise specified cost $6,630,948 or 4.9 per cent. of all material expenditures.

As has been said, information regarding material purchases on account of public-roads projects is not available and it is not possible to give more than the total figure, $56,239,535, for the six-month period. As some of the monthly figures included in this total, such as the March figure of $7,400,000, are estimates, the total is not to be taken as an actual record.

(Continued on page 42)

Cement Industry's Only New Plant Nears Completion in Lehigh Valley

National Portland Cement Co. Plant Will Be Placed in Operation Next December

By W. E. TRAUFFER

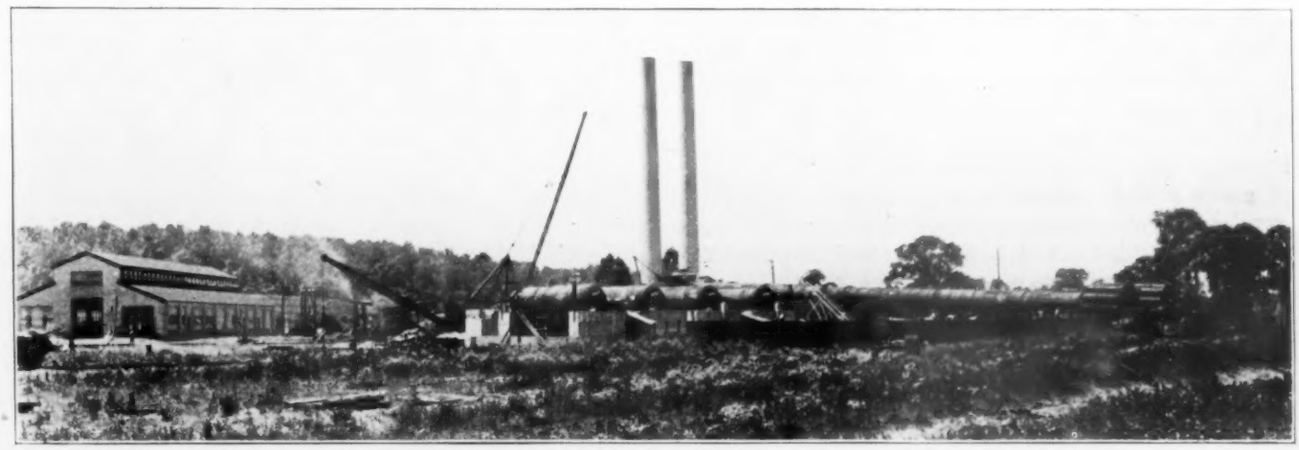
THE cement industry has before it, for the first time in years, the prospect of added capacity in the form of a new plant which is now under construction in the Lehigh Valley cement district. The National Portland Cement Co., which had begun preliminary construction of its plant at Brodhead, Pa., early in 1933, began active construction in February 1934. At the time this article was written, late in June, the plant already was taking definite form. The concrete kiln stack, office and combined machine-shop and parts-storage building had been erected; the two kilns with their attached coolers and the four raw- and finish-grinding mills had been installed. Considerable other equipment was on hand ready to be installed. Pouring of the concrete machinery and building foundations had been practically completed and construction of the large slurry-storage basin was under way. The plant is scheduled to go into operation some time in December of this year.

The plant incorporates the latest approved methods of operation and equipment. Special attention was given in its design to efficiency and economy of operation. Simplicity has been attained without sacrificing flexibility and the number of equipment units has been kept small. The fact that the entire plant site covers an area of only 22 acres attests to the compactness of the design. Both standard Portland and high-early-strength cements will be produced under the brand name of "Pioneer." The thoroughness with which preparations have been made for the operation of this plant is evident from the fact that large quantities of cement have already been sold under this brand name. This cement is temporarily being made to order in another plant in the vicinity.

The plant is designed to have a capacity of 3,600 bbl. daily and about 1,250,000 bbl. annually, but is so laid out that this capacity can be doubled or tripled without disturbing the present arrangement. All the plant buildings are to be of steel-frame construction with Keasby and Mattison corrugated cement-asbestos roofing and siding. The electric substation and the shop building are built of steel and concrete brick. A Chisholm-Moore 5-ton overhead crane has been installed in the shop building. The plant office building also houses the physical and chemical testing laboratories.

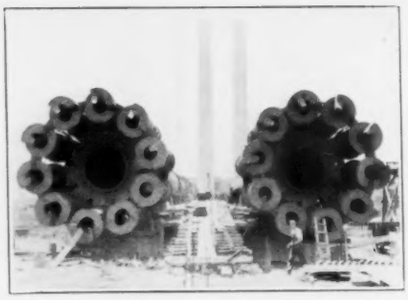
The deposit consists of 300 acres of high-calcium Trenton limestone and Lehigh cement rock and was thoroughly tested before construction of the plant was begun. Richard K. Meade & Co., Inc., in their report stated that "sufficient raw materials to manufacture 100,000,000 bbl. of high-early-strength Portland cement underly the property."

The clay overburden is comparatively light and this is now being removed by a shovel and is taken by trucks to a dump near the plant. The location of this deposit on a side hill will allow the development of a 65- to 100-ft. face without dropping the quarry floor very far below the plant ground-level. Two P & H 2-cu.yd. electric quarry shovels will load the stone into Atlas 8-cu.yd. steel quarry cars which will be hauled by 12-ton Vulcan gasoline locomotives to the foot of the incline leading to the crusher building. A Vulcan hoist will haul the cars up the incline to a feeder ahead of the Kennedy-Van Saun gyratory primary crusher. A Kennedy-Van Saun



General view showing progress of construction on new plant of the National Portland Cement Co., at Brodhead, Pa. Machine-shop and storage buildings at left; raw- and finish-grinding mills in foreground; kilns with attached coolers and stacks in background.

Overburden being removed from quarry which is being opened near plant.



The two kilns and stacks with coolers attached to kilns.

The four multi-compartment raw- and finish-grinding mills.

vibrating screen and two secondary gyratory crushers of the same make complete the preliminary stone-processing equipment. A 36-in. belt-conveyor will discharge the stone to a surge-bin or to the rock storage. A second 36-in. conveyor will feed from the surge-bin to the raw-grinding mill-feed bins.

Because of the high lime content of the rock it is expected that the addition of clay to the mix will sometimes be necessary. This clay can be reclaimed from the overburden dump and the cars hauled by the rock-car hoist to the clay-washing building which adjoins the crusher building. An F. L. Smidth clay washer and agitating and mixing tanks will be used and the clay slip handled to the raw mills by Wilfley pumps.

Raw grinding will be done by two 8-ft. multi-compartment F. L. Smidth wet-grinding mills driven through Symetro drives by 900-hp. motors. Wilfley pumps will force the slurry into six 22-ft.-diameter correcting tanks. These will discharge by gravity into a rectangular slurry-storage basin of 17,000-bbl. capacity which will be equipped with a Smidth traveling agitator. Wilfley pumps will handle the slurry from this basin to the kiln feeders. The two F. L. Smidth kilns are 10 ft. in diameter and 380 ft. long and are equipped with 10-cell, single-row Unax coolers. These kilns are to be equipped with the latest control and regulating equipment including induced-draft fans. The concrete kiln stacks are 180 ft. high and have independent core brick linings. Skipulters will handle the clinker to storage.

The coal for kiln firing will be discharged from cars into a track hopper. A Jeffrey hammer-mill will reduce the coal before it is put in storage. It will then be rehandled to the coal mill, where it will be pulverized by F. L. Smidth combination tube-mills and driers.

The covered storage building will have storage capacity for 100,000 bbl. of clinker, 4 weeks' supply of stone and 6 months' supply of coal. A P & H overhead crane, having a span of 80 ft. and fitted with a 3-cu.yd. clam-shell bucket, will handle these materials to and from storage.

The clinker will be rehandled into bins feeding the two F. L. Smidth finish-grinding mills which are duplicates of the raw mills. F. L. Smidth air-separators are to be used in connection with these mills and the finished cement will be handled to storage by an F. L. Smidth pneumatic-conveying system. The cement storage will consist of 25 concrete silos, each 25 ft. in diameter and having a total capacity of 250,000 bbl. Three Fuller-Kinyon pumps of the mounted type under the silos will reclaim the cement into bins in the pack-house. A Fuller rotary compressor will supply the air. F. L. Smidth Fluxo bag-packers will be used and the sacks will be loaded into cars by a portable system of conveyors. Provisions are also being made for bulk-cement shipments. The Modern Valve Bag Co., Jersey City, N. J., has contracted for the packing of the cement.

Power is to be purchased from the Metropolitan Edison Co. at Reading, Pa., at 32,000 v. This will be reduced to 2,200 v. and 440 v. in a substation which is in the exact center of the plant. This arrangement puts all the plant motors within a 400-ft. radius of the substation and all the large 2,200-v. motors within 50 ft. The plant is designed so that grinding can be done at night off the peak-load hours.

Ample water is available. The Monocacy Creek traverses the property through a new channel and supplies the wells driven for the water-supply. An 8,800,000-gal. earth-fill reservoir insures an ample supply during dry seasons.

The plant is located about 11 mi. northeast of Allentown and 5 mi. north of Bethlehem near the eastern fringe of the Lehigh Valley cement district. It is at the intersection of state highways leading in four directions which will facilitate the makng of truck shipments. A switch track connects with the main line of the Lehigh & New England Ry. which passes the plant property. This line also makes direct connections with the Central R. R. of New Jersey, the Lehigh Valley R. R., the Delaware, Lackawanna & Western R. R., the Pennsylvania R. R., and the Reading R. R.

The company's engineering staff under A. P. Hachtmann, chief engineer, made the general design of the plant and is supervising the construction and installation of the equipment. The various manufacturers furnishing the major equipment designed their installations to fit the general plan. The M. A. Long Co. made the detailed drawings and has the contract for the general construction work. All concrete is being mixed in a central plant and is conveyed wherever needed by a Chain-Belt Rex Pumpcrete system.

F. L. Smidth & Co. are furnishing most of the equipment for this plant, including the kilns, coolers, raw-material and clinker-grinding mills, coal

(*Continued on page 42*)

Standard and Special Cement Can Be Made of Inferior Raw Materials

New Method Breaks Up Cement Rock and Recombines in Desired Proportions

CHARLES H. BREERWOOD, assignor to Valley Forge Cement Co., was granted on Oct. 24, 1933, United States Patent No. 1,931,921, covering the "manufacture of cement." The process, which may be described briefly as the separation of the constituents of cement rock, the discarding of the undesirable ones, and the recombining according to predetermined proportions of the desirable ones, is designed to make possible the manufacture of Portland cement of almost any required characteristics.

The new method not only makes it possible "to produce final mixtures of the desired analysis from available inferior materials which contain all the essential constituents but in unsuitable proportions without adding thereto materials obtained from outside sources," but is also said to make possible important savings in the quarrying of the raw material and in the grinding. By this method excessive quantities of an essential element of the final mixture to be burned can be discarded or deficiencies in an essential ingredients can be made up, the separation of the ingredients in accordance with this method making available quantities of an individual ingredient for disposal in either of the two ways mentioned.

The method further comprehends the use of flotation for the separation of certain of the essential ingredients of the raw cement-material mixture. It is also claimed that this method allows close control of the quantities and ratios of all the important constituents of the final mixture and thus makes it possible to approach closely, and in some cases actually attain, a mixture of theoretically-correct analysis on a molecular basis. From rocks ordinarily considered unusable can be produced a true Portland cement of high tricalcium-silicate content or lime saturation, a cement low in tricalcium silicate and high in dicalcium silicate, and various special cements such as those known as high-alumina and iron cements and others manufactured for specific uses. All these standard and special cements, it is claimed, can be produced from the same original materials without additions to modify the composition.

A further advantage offered by the new method is the elimination from the raw cement-material mixture of the excess of free silica in the form of quartz or sand, which is relatively hard and difficult to grind and does not combine readily at normal kiln temperatures. The possibility of eliminating the excessive free silica by this method is said not only to reduce the cost of grinding the raw materials and the clinker as well as the fuel cost, but also makes it possible to produce a cement of better quality than was formerly possible.

This method involves the application of the principle of flotation to the cement industry, it is believed, for the first time. It is said that flotation may be successfully used to separate the lime-bearing ingredients from the silica, iron and alumina and that it can be carried on in connection with the grinding of the material under such conditions that a saving in grinding costs, more than sufficient to cover the cost of practicing the flotation process, is made.

In the development of this process Mr. Breerwood discovered that, contrary to the generally-accepted belief, many of the so-called combined materials are not chemically combined but are in reality physically bonded in finely-divided condition. It is because of this condition that an excess of free silica in a deposit can be removed and discarded before the rock is reduced to ultimate fineness so that power will not be wasted in grinding it. Only a portion of the new material is removed during the process of reducing the rock and its constituents are aggregated so that the free silica can be discarded to correct the ratio, and the limestone recovered can be returned to the raw materials undergoing final grinding in such amounts as to increase the proportion of the lime and make up for the deficiency in the original supply.

In the separation process the calcite is separated from the quartz and other forms of free silica by flotation under such conditions that the calcite is floated while the residue contains the silica and materials, such as iron, which can be separated from the silica by concentration operations. The flotation is carried out in flotation cells of the usual construction with normal flotation agents. It has been found satisfactory to form a pulp with an excess of water so that useless and deleterious materials, such as graphite and alkalies, may be removed by decantation as the excess of water overflows. In the case of the specimen discussed in the patent about 50 per cent. of the tailings are subjected to separation, but with rocks of other analyses, a greater or lesser amount of the materials will be so treated depending upon the composition of the rock in question.

P. W. A. Purchases (from page 38)

Although detailed figures for individual materials are not available, it is possible to estimate roughly the probable distribution. On the basis of experience with other road projects, state and Federal, it is reasonably safe to say that non-metallic minerals—cement and aggregates—account for about 45 per cent. of the total. On this assumption the amount expended for these materials for public-roads projects may have been about $25,307,790. Every dollar spent for public-works projects is worth about 19 times as much to producers of cement and aggregates when spent for roads as when spent for other types of projects. Expressed another way, while only 2.6 c. of every dollar spent for materials for public-works projects other than roads goes for crushed stone, sand and gravel and cement, approximately 45c. of every dollar spent for materials for public-roads projects reaches the producers of these materials.

If this relationship is maintained, the $400,000,000 allotted for highway work will be equivalent, in terms of aggregates and cement demand, to $7,600,000,000 worth of public-works projects of other kinds. Or, stated in another way, the $2,900,000 available for general public-works projects under the original act—$3,300,000,000 less the $400,000,000 set aside for roads—represents no more, as a market for these materials, than an expenditure of $152,631,584 for roads.

These comparisons emphasize the tremendous importance to the nonmetallic-mineral industries of road-building activities. Under the new Cartwright bill, recently passed by Congress and signed by the President, $772,000,000 is made available for highway work in the next three fiscal years. To this must be added the unspent portion, about $230,000,000, of the original $400,000,000 fund, making a total of $1,002,000,000 appropriated (and partly obligated but not spent) for road construction.

Table IV—MATERIALS PURCHASED BY CONTRACTORS AND GOVERNMENT AGENCIES FOR PROJECTS FINANCED FROM PUBLIC-WORKS FUNDS TO MARCH 15, 1934

Material	Month Ended March 15	Total to Date	Percentage of Total
Non-metallic Minerals:	**$853,041**	**$6,781,992**	**5.12**
Cement	371,665	1,986,284	.....
Sand and gravel	240,309	1,247,095	.....
Stone: Crushed	31,383	261,830	.....
Marble, granite, slate and other stone products	209,684	3,247,908	.....
Minerals and mineral earths	.....	38,875	.....
Non-metallic-Mineral Products:	**1,114,016**	**5,389,094**	**4.07**
Clay products	327,051	1,269,144	.....
Concrete products	351,284	2,647,865	.....
Glass	11,384	101,706	.....
Paving materials and mixtures	138,865	743,393	.....
Roofing, asphalt shingles, roof coatings other than paint	229,370	450,154	.....
Wall plaster, wall board, insulating board, floor composition	56,062	176,832	.....
Metals and Metal Products:	**26,988,017**	**58,553,840**	**44.15**
Cast-iron pipe and fittings	475,928	1,842,899	.....
Copper products	22,731	56,249	.....
Doors, shutters, window sash and frames, molding and trim	119,434	355,813	.....
Forgings (iron and steel)	631,816	1,487,265	.....
Foundry and machine-shop products (other)	4,553,542	8,607,108	.....
Hardware (misc.), bolts, nuts, nails, spikes, etc	617,567	1,192,675	.....
Nonferrous-metal alloys and products, except aluminum	100,837	417,516	.....
Planing-mill products	117,887	880,907	.....
Rails and switches (steel)	7,986,489	7,986,489	.....
Sheet-metal work	238,619	758,947	.....
Smelting and refining lead	10,176	21,836	.....
Springs (steel)	156,249	204,474	.....
Steel-works and rolling-mill products, including structural and ornamental	11,408,669	32,703,626	.....
Tools (other than machine)	102,388	364,230	.....
Wire and wire work	445,685	1,673,806	.....
Machinery and Apparatus:	**29,252,180**	**45,212,733**	**34.09**
Aircraft and parts	761,680	3,696,526	.....
Electrical machinery and supplies	1,281,695	7,022,701	.....
Engines and turbines	651,212	1,807,052	.....
Firearms	.....	301,390	.....
Instruments (professional and scientific)	97,646	779,317	.....
Lighting equipment	45,946	515,464	.....
Locomotives (other than electric)	2,587,995	2,587,995	.....
Machine tools	244,627	1,516,183	.....
Motor cars	63,612	63,612	.....
Motor trucks	53,044	276,315	.....
Plumbing supplies	317,728	1,098,086	.....
Pumps and pumping equipment	315,993	1,263,448	.....
Railway cars (freight, express, passenger)	22,672,511	22,672,511	.....
Refrigerators (ice and mechanical)	43,542	170,800	.....
Steam and hot-water heating apparatus	114,949	1,350,333	.....
Lumber and Timber Products	**2,369,250**	**9,113,787**	**6.88**
Fuels and Lubricants:	**311,376**	**1,049,138**	**.79**
Coal	50,398	177,505	.....
Fuel oil	116,423	353,105	.....
Gasoline	107,039	416,328	.....
Lubricants	37,516	102,200	.....
Others	**1,046,904**	**6,630,948**	**4.90**
Totals	**$61,973,659**	**$132,640,532**	**100.0**
Public-roads projects [1]	**7,400,000**	**56,239,535**	.....
Grand totals	**$69,334,754**	**$188,870,067**	.....

[1] Information not available by type of material.

New Cement Plant (from page 40)

mills, Skipulters, air-separators, slurry and clay agitators, clay wash-mill, bag-packers, and a cement transport system. The Kennedy-Van Saun Mfg. & Engr. Corp. has contracted for all the equipment for the crusher building, including feeders, primary and secondary crushers, vibrating screen, etc. The Fuller Co. is supplying the Fuller-Kinyon system for transporting cement from the silos to the packers and a rotary air-compressor. The two quarry shovels and an overhead traveling crane are being supplied by the Harnischfeger Corp., and the quarry locomotives and hoist by the Vulcan Iron Works. The kiln stacks were erected by the Alphonse Custodis Chimney Co. The Westinghouse Electric Mfg. Co. is supplying all the electric motors and equipment. Harbison-Walker firebrick is used in the kilns. All the pumping of clay slip and slurry is to be done with Wilfley pumps.

This plant culminates years of effort on the part of Fred B. Franks, vice-president and general manager of the company, who conceived the project and was responsible for much of the general design of the plant. Mr. Franks has had a long connection with the cement industry, having been vice-president and general manager of the Martin's Creek Portland Cement Co. from 1899 to 1904, the Bath Portland Cement Co. from 1904 to 1926 and the Keystone Portland Cement Co. from 1926 to 1929. He also supervised the construction and operation of each of these plants during the periods mentioned. Other officers of the company are: William M. Richardson, president; Hugh J. Larkin, assistant vice-president and assistant general manager; John D. Shibe, treasurer; George M. Richardson, secretary. The board of directors, in addition to the above, includes Thomas W. Cunningham, Jr., L. Elwood Dize, Arthur P. Houser, and Joseph L. Scott.

Cement-Plant Quarry Also Supplies New Commercial Stone-Crushing Plant

Allentown Cement Concern Develops Deposit of High-Calcium Limestone

THE Allentown Portland Cement Co. has opened its own limestone quarry at Kirbyville, 2 mi. by paved road from its plant at Evansville, Pa. The extent of the deposit and the character of the stone more than justified the construction of a commercial stone-crushing plant of 1,000 tons daily capacity, which has recently been placed in operation. This plant is now marketing stone of all commercial sizes, in addition to supplying the cement mill with the relatively small tonnage of limestone needed to correct the composition of its cement rock. The crushing plant is located on the Reading-Allentown highway, a new three-lane concrete road, about midway between Reading and Kutztown.

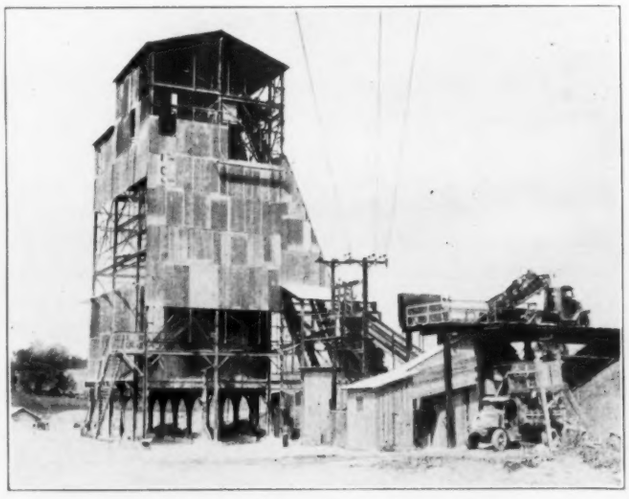
The limestone averages slightly above 90 per cent. calcium carbonate, and is sufficiently clear of clay and dolomite to make truck loading direct from the shovels entirely satisfactory for supplying the cement mill. In fact, this practice has been followed for the past year. The Pennsylvania State Highway Dept. has also given the quarry its approval.

The property comprises about 125 acres. The discovery of the deposit and the geological survey was made by one of the officers of the cement company, and the results of extensive drilling operations were confirmed by an eminent consulting geologist before the quarry was opened. This discovery is especially interesting, since it was generally believed that no large deposits of high-grade limestone were to be found in the Eastern Pennsylvania cement district. Quarry operations are simple, due to the formation of the rock and the comparatively light overburden.

One Marion No. 37 crawler steam shovel and one 1¼-cu.yd. Marion shovel load the trucks. As the stone is practically at the surface, mild grades to the plant make dump trucks the most economical method of delivering stone to the primary crusher. Mack trucks are being used for this purpose.

Shovel loading truck in new high-lime quarry of Allentown Portland Cement Co.

The plant was designed to take advantage of gravity flow as far as practicable. The dump trucks discharge from a ramp into a 28-in. by 36-in. Traylor jaw crusher, the discharge being elevated by an apron conveyor and spouted to either of three secondary crushers, one 6½ Fuller Lehigh and two No. 4 Allis-Chalmers McCully gyratory crushers. The stone is elevated 75 ft.



General view of plant with one truck discharging into crusher. Truck below is being loaded with cement rock.

Truck discharging into primary jaw crusher. Apron conveyor under crusher feeds secondary crushers.

by an inclined 24-in. continuous belted-bucket elevator on 80-ft. centers to the screens. The screens comprise one 48-in. by 25-ft. Traylor revolving screen with a dust jacket, one 48-in. by 10-ft. Traylor revolving screen and two Mitchell electric vibrating screens.

From the screens the stone is spouted to steel storage-bins above two trucking bays, paved with concrete, there being two 200-ton cylindrical steel bins above each bay, and an interspace bin, giving a total bin capacity of 1,000 tons. Ground-storage space for an additional 20,000 tons is also now in use. A 30-ton Howe truck scale is installed between the main highway and the plant for convenience in weighing commercial stone, as well as stone delivered directly from the quarry to the cement mill.

Construction of the entire plant is substantially completed, including the compressor-house, blacksmith shop, storm sewers and paving, but the stone-crushing plant was not completely inclosed by siding when this article was written. A 30-in. by 16-in. Traylor heavy-duty roll crusher and a 24-in. by 30-in. Cutler-Hammer magnetic pulley are awaiting installation.

California Nonmetallics (from page 36)

the borax industry in the desert playas or dry lakes, some 40 yr. ago. This new mineral is "kernite" (or rasorite"), a sodium borate with a smaller water-of-crystallization content than the "borax" of commerce, so that when recrystallized to borax, the resulting product has an increased weight over the mined material. These deposits have been opened through shafts by the Pacific Coast, Suckow, and Western borax companies, in southeastern Kern County. An important tonnage of refined borax is now recovered, also, from the brines of Searles Lake, San Bernardino County, by the American Potash & Chemical Corp. as a by-product in the crystallization of potash salts.

Salt.—Most of the salt produced in California is obtained by evaporating the waters of Pacific Ocean, plants being located on the shores of San Francisco Bay, Monterey Bay, Long Beach, and San Diego Bay. Additional amounts are derived from lakes and lake beds in the desert regions of the state. The salt production of San Bernardino County is in part derived from deposits of rock salt, which are worked by means of quarrying and steam-shovels. Some also is prepared by crystallization from the brines of Searles Lake, which are worked mainly for potash and borax. A small amount of valuable medicinal salts is occasionally obtained in Mono and Tehama Counties by evaporation from Lake Mono and mineral springs, respectively.

Formerly a considerable proportion of the table salt consumed in California was shipped in from eastern points, but at present California salt refineries supply not only her own needs but export a fair tonnage to other markets.

Dolomite.—Limestones are frequently more or less magnesium-bearing, and a chemical analysis is often necessary definitely to decide as to whether they are calcite (calcium carbonate) or dolomite (calcium-magnesium-carbonate), which stands intermediate between calcite and magnesite (magnesium carbonate). An important part of the tonnage of dolomite quarried in California is utilized as a substitute for magnesite in refractory linings for the bottoms of open-hearth steel furnaces. Calcined dolomite has also been used by paper mills, replacing an artificial mixture of calcined limestone and magnesite in the sulphite process of manufacture of paper from wood pulp. Some dolomite is used for its carbonic-acid gas and some has been burned for dolomitic lime. The principal producing districts in California thus far have been in Inyo, Monterey, San Benito, San Bernardino, and Tuolumne Counties.

Summary.—In round numbers, the value of California's mineral groups has averaged approximately $400,000,000 annually for several years past—except 1930-1931 which showed a decrease—divided roughly as follows: Fuels, $320,000,000; metals, $18,000,000; structural materials, $46,000,000; industrial materials, $7,000,000; salines, $9,000,000.

A. S. T. M. Meeting (from page 28)

cured specimens at ages greater than 28 days exhibited by the high-early-strength cement.

2. Increased expansion of mortars in moist air but decreased shrinkage in dry air at 18 months resulted from longer periods of moist curing. This was true for all water contents and for both types of cement. The difference in volume change between the normal Portland and high-early-strength cement was not of great importance.

3. Mortars of better quality were less absorptive, regardless of whether the better quality was due to a lower water content or prolonged curing.

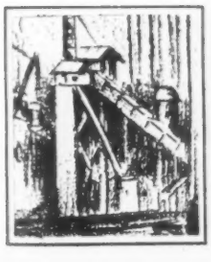
4. Up to a certain period increasing the duration of moist-curing of the concrete before exposure increased its resistance to the destructive effects of freezing and thawing, but further curing had no effect in increasing resistance. The length of this beneficial curing period depended on the type of cement and the water content of the paste. With a given cement and curing periods sufficient to develop the maximum resistance in each case, the richer mixes gave greater resistance than lean mixes of the same strength at the time of exposure.

5. The rate of capillary flow in mortars is influenced by the duration of exposure, by the type of cement and the quantity of the mixing water. Even the mortars of high water content in a relatively short time reached a uniform rate of leakage, which was quite small compared with the rate of leakage when first exposed.

MEN OF THE INDUSTRY

J. C. BUCKBEE

J. C. BUCKBEE, recently elected chairman of the board and chief executive officer of the Consolidated Rock Products Co. of Los Angeles, has been prominent in the nonmetallic-minerals industries for a quarter-century. His long experience in the design and operation of cement, crushed-stone and sand-and-gravel plants has included every phase of administrative and production control. He is coöwner and president of the Northern Gravel Co. of West Bend, Wis. As one of the organizers of the National Sand & Gravel Assn., he has remained active in its affairs, serving at present as a member of its board of directors. He played a leading part in the formulation of the mineral-aggregates code and in its administration in Region 10.



Personal Mention

O. A. St. Clair, former chief engineer of the Atlantic Gypsum Co., New York City, on Feb. 1 was appointed professor and head of the Dept. of Engineering Drawing and Graphics at Texas Technological College, Lubbock, Tex. This department is now known as the Dept. of Engineering Drawing & Industrial Education.

H. M. Van Cleve, who has been in charge of sales for the bituminous-mixing plant of the General Crushed Stone Co. at Horseheads, N. Y. since it went into operation a year ago, will also have charge of sales for the new plants being erected by the company at Geneva and Auburn, N. Y. He will make his headquarters in Geneva but will retain the sales office in the Realty Bldg., Elmira.

R. A. Bechtold, superintendent of the plant of the Pennsylvania-Dixie Cement Corp. at Des Moines, Ia., recently gave a talk on his hobby "Palmistry" at a club luncheon in that city.

Ben White was reelected president of the Southern States Portland Cement Co., Rockmart, Ga., at a recent directors meeting.

M. O. Matthews, general manager of the Oklahoma Portland Cement Co., Ada, Okla., was recently elected to the board of directors of the Southern States Industrial Council.

Gordon Tongue, treasurer of Superior Portland Cement, Inc., Seattle, Wash., has been elected treasurer of the Manufacturers Association of Washington.

Jacob Weisheyer was elected secretary and treasurer of the Missouri Portland Cement Co., St. Louis, Mo., at the recent annual meeting of the board of directors. **William H. Keeping** was elected assistant secretary and **E. W. Henne,** assistant treasurer. All other officers were reelected.

Earl Zimmerman, vice-president of the Ohio Gravel Co., Cincinnati, O., has been appointed to active membership on the Regional Adjustment committee for Region 8 of the mineral aggregates code authority.

John O'Callaghan has been appointed superintendent of the plant of the Lone Star Cement Co., Bonner Springs, Kans. He succeeds the late **Edwin Struckmann.**

E. W. Rice, chief chemist of the Santa Cruz Portland Cement Co., Santa Cruz, Cal., recently delivered an address before the Kiwanis Club in that city on the development and manufacture of cement. Mr. Rice has been connected with this plant for 25 years.

Mathew Van Siclen, formerly of the U. S. Bureau of Mines, is now consulting mining engineer for the Turkish Government.

George C. Branner was recently elected president of the Association of American State Geologists. Arthur Bevan is secretary.

John C. Hopkins has been appointed district sales manager of the Cleveland office of the General Refractories Co., Philadelphia, Pa. His headquarters are in the Leader Bldg. **James P. Raugh** is associated with the same office.

Wm. E. Umstattd was elected president of the Timken Roller Bearing Co. at a special meeting of the Board of Directors on June 16, succeeding **H. H. Timken,** resigned. Mr. Timken remains as Chairman of the Board. **Henry H. Timken, Jr.,** was elected a vice president of this company and of the Timken Steel & Tube Co.

C. A. Webb has been appointed sales manager of the Universal Atlas Cement Co., Chicago, Ill., and will have charge of the Chicago metropolitan territory. The remainder of Illinois and Indiana, lower Michigan and southern Wisconsin remain in charge of **Edward Quebbeman,** sales manager.

W. R. Judson has been appointed by the Allis-Chalmers Mfg. Co., as manager of the Salt Lake City, Utah, district office. His office is in the Kearns Bldg., Salt Lake City. He succeeds **H. E. Weiss,** who has been transferred to the Company's office at Kansas City.

Obituary

Llewellyn W. Jones, 72, founder and president of the Manganese Steel Forge Co., and president of the Audubon Wire Cloth Co., Philadelphia, Pa., died at his home in Rosemont, Pa., June 24, after an illness of two years. Mr. Jones had a wide and varied experience in manufacturing and engineering before he founded the Manganese Steel Forge Co. in 1921. Among the many developments credited to him is the production of the first drawn manganese steel wire.

Henry J. DeVries, 69, former operator of stone quarries near Holland, Mich., died June 2 at his home in that city.

Ruel C. Warriner, vice-president of the Calaveras Cement Co., San Francisco, Cal., died suddenly July 1 in Johannesburg, South Africa.

Edward D. Boyer, 77, for 50 years prominent in the cement industry as a cement plant engineer, died June 12 at a hospital in Bound Brook, N. J. After graduating from Lehigh University he devoted his time to cement plant engineering and later became associated with the Universal Atlas Cement Co. as technical adviser, retiring in 1931 after 23 years with that company. Mr. Boyer was active in the affairs of the A.S.T.M. and was recognized as one of the foremost authorities in the cement industry.

Frank C. Jordan, 49, prominent in the sand and gravel and cement block business in Elkhart, Ind., for years, died June 22 as the result of injuries sustained in an automobile accident. Mr. Jordan had only a week before purchased the plant of the Standard Sand & Gravel Co. near Terre Haute, Ind.

Capt. Elmer McCraney, 67, president of the Milan Sand & Gravel Co., Milan, Ill., died June 18 at his home in Davenport, Ia., after an illness of three weeks.

George A. Fisher, 55, general manager of the Yosemite Portland Cement Corp., Merced, Cal., died May 23 at his home in that city after a long illness. Early this year his title had been changed to vice-president in charge of operations. Mr. Fisher was one of the pioneers and outstanding figures of the cement industry on the Pacific Coast and had been in charge of the erection of a number of plants, including the one at Merced.

Arthur E. Fretageot, 60, owner of the New Harmony Gravel Co., New Harmony, Ind., died June 2, after a long illness.

Lawrence B. Macy, former night chief engineer for the Universal Atlas Cement Co., Hudson, N. Y., died June 19.

Walter Shea, 32, vice-president of the Shea-Donnelly Stone Co., Lynn, Mass., died June 1 at his home in that city.

▼ *Coming Events* ▲

July 16, 1934, Madisonville, Ky.—Kentucky State Hearing on Permissive Areas for the Mineral Aggregates Industries, Madison Hotel.

July 20, 1934, Ashland, Ky.—Kentucky State Hearing on Permissive Areas for the Mineral Aggregates Industries, Henry Clay Hotel.

July 25, 1934, Frankfort, Ky.—Kentucky State Hearing on Permissive Areas for the Mineral Aggregates Industries, Capital Hotel.

December 6-7, 1934, Washington, D. C.—Fourteenth Annual Meeting of the Highway Research Board of the National Research Council, National Research Council Bldg., Washington.

Jeffrey Mfg. Co. Appoints New Sales Representative

The Jeffrey Mfg. Co., Columbus, O., has appointed George C. Bowers as sales representative for its material handling line in the states of Minnesota, North Dakota, and South Dakota. His office will be at 311 Third Ave., Minneapolis, Minn.

New Corporations

THE WASHINGTON-IDAHO LIME CO., N. 107 Freya St., Spokane, Wash. Capital stock $250,000. R. H. Wills, B. R. Smith and E. J. Simons, Jr.

THE WILFERT SAND & GRAVEL CO., Eugene, Ore. Capital $5,000. Maureen Russell, E. C. Wilfert and M. O. Wilfert.

THE CITRUS ROCK CO., Inverness, Fla. J. S. Johnson, 708 Caracas, Tampa, Fla.

THE ATLAS SAND & GRAVEL CO., Janesville, Wis. Edwin C. Schultz, F. C. Schultz and Frank A. Schultz.

CONSTRUCTION AGGREGATES CO., 33 N. La Salle St., Chicago, Ill. 100 shares common. Incorporators, Ezra Sensibar, John M. Balk, Leo Wolfson. To manufacture, acquire, produce, buy, sell or dispose of, wholesale or retail, coal, sand, gravel and building materials. Correspondents: Levinson, Becker, Gilbert, Peebles & Swiren, 1 N. La Salle St., Chicago.

RIVERSIDE SAND & GRAVEL CO., Grand Rapids, Mich. Capital $50,000.

AMERICAN ROCK WOOL CORP., Marion, Ind. 500 shares of stock at par value $100. Incorporators, Robert Fahy, William I. Westvelt and Michael Luery.

MUNDY & GRAD STONE CO., INC., Delaware, O. 100 shares n. p. v. Charles S. Mundy, Clifford A. Grad, Dora B. Grad, Marriott & Marriott.

BREAKWATER STONE CORP., Stony Creek, Conn. Capital 400 shares n. p. v., paid $2,000. Incorporators, Emile Bonnot, J. A. Lauridsen, F. F. Kane.

Aggregates Statistics

SHIPMENTS of aggregates on Class I railroads increased sharply during the first quarter of 1934 in comparison with the corresponding period of 1933. According to statistics of the Interstate Commerce Commission, summarized in Table I, railway shipments of sand and gravel from January to March, 1934, increased 34.6 per cent. above those of 1933. Crushed-stone shipments were only 11.2 per cent. higher than in 1933, but slag advanced 66.4 per cent.

Barge shipments of sand and gravel on the Allegheny and Ohio Rivers in the Pittsburgh district dropped 7.3 per cent. below the first quarter of 1933. Most of this decline can be attributed to severe winter weather which virtually stagnated river traffic, particularly during February.

Total shipments of all aggregates accounted for during the first quarter of 1934 amounted to 6,519,495 short tons, an increase of 27.2 per cent. from the 5,126,612 short tons shipped in 1933. This total is higher than the first quarter shipments of 1932 but considerably lower than those of previous years.

▼

By H. H. HUGHES and K. G. WARNER

Bureau of Mines, Department of the Interior

Shipments of Portland cement provide an excellent indicator of demand for aggregates. From January to March, 1934, 11,348,000 bbl. of cement was shipped from mills, an increase of 36.9 per cent. from the first quarter of 1933.

Large tonnages of aggregates also are used with asphalt in bituminous roads and, to a lesser extent, in the roofing trades. The indicated domestic demand for asphalt during the first quarter of 1934 was 1.7 per cent. lower than for the comparable period of 1933.

The index of industrial production compiled by the Federal Reserve Board averaged 82.0 from January to March, 1934. This represented a net gain of 19 points, or an increase of 30.2 per cent. from 1933. The increase in aggregates shipments was roughly parallel to the advance in the index of industrial production but previously the demand for aggregates, as well as that for other building materials, had dropped to levels far lower comparatively than the decline in industrial production.

Highway Construction.—The total yardage of concrete-pavement contracts awarded for three months of 1934 was 27.4 per cent. greater than in 1933. Apparently this increase was confined to street and alley construction, because contracts for roads declined 15.9 per cent. from 1933. Most of the highway construction since the summer of 1933 has been dependent upon funds available from the Federal public-works program, and the magnitude of awards in 1934 will depend to a considerable extent upon continuation of allotments.

Building Construction.—The impetus of the public-works program raised the value of construction contracts awarded during the first quarter of 1934 to a level 135.4 per cent. higher than that of 1933. The monthly average of awards for three months of 1934 was $153,842,000, compared with $65,342,000 in 1933. The floor

Table I—MOVEMENTS OF AGGREGATES AND INDICATORS OF THEIR MARKETS IN THE FIRST QUARTER OF 1934 COMPARED WITH 1933

(Gains are shown in bold-faced type, losses in light-faced type.)

	First Quarter		
	1933 Jan.-March	1934 [1] Jan.-March	Change from 1933 (*per cent.*)
Railway Shipments, Class I roads [2] (excludes nonrevenue railroad ballast):			
Sand and gravel [3] ..... *short tons*	2,907,145	3,912,330	**34.6**
Crushed stone [4] ..... *short tons*	1,798,740	1,999,446	**11.2**
Furnace slag ..... *short tons*	295,488	491,684	**66.4**
Water Shipments, Pittsburgh district [5]:			
Sand and gravel ..... *short tons*	125,239	116,035	7.3
Total aggregates accounted for ..... *short tons*	5,126,612	6,519,495	**27.2**
General Business Activity:			
Portland-cement shipments [6] .. *bbl.*	8,290,000	11,348,000	**36.9**
Indicated domestic demand, petroleum asphalt [7] .... *short tons*	260,221	255,674	1.7
Index of industrial production [8] ..... *index numbers*	63.0	82.0	**30.2**
Highway-Construction, Concrete-Pavement Contract Awards [9]:			
Total, monthly average ..... *sq. yd.*	2,841,000	3,620,000	**27.4**
Roads only, monthly average ..... *sq. yd.*	2,629,000	2,210,000	15.9
Building-Construction Contract Awards:			
Total-value, monthly average [10] ..	$65,342,000	$153,842,000	**135.4**
Residential floor space, monthly average [10] ..... *sq. ft.*	3,694,000	5,208,000	**41.0**
Engineering construction, value, monthly average [11]	$71,280,000	$101,015,000	**41.7**

[1] Figures for 1934 may be subject to revision.
[2] Interstate Commerce Commission.
[3] Excludes glass and molding sand.
[4] Excludes fluxing stone.
[5] Chief Statistician, Board of Engineers for Rivers and Harbors.
[6] B. W. Bagley, U. S. Bureau of Mines.
[7] A. H. Redfield, U. S. Bureau of Mines.
[8] Federal Reserve Board; 1923-1925 average=100.
[9] Portland Cement Assn.
[10] F. W. Dodge Corp. [11] *Engineering News-Record.*

Table II—RAILWAY SHIPMENTS OF AGGREGATES IN THE FIRST QUARTER OF 1934 COMPARED WITH 1933, BY REGIONS[1] (*Short tons*)

(Gains are shown in bold-faced type, losses in light-faced type.)

Region	First Quarter		
	1933 Jan.-Mar.	1934 [2] Jan.-Mar.	Change from 1933 (*per cent.*)
New England:			
Sand and gravel	4,085	7,398	**81.1**
Crushed stone	11,681	12,221	**4.6**
Furnace slag			
Total	15,766	19,619	**24.4**
Great Lakes:			
Sand and gravel	86,311	181,915	**110.8**
Crushed stone	56,158	74,020	**31.8**
Furnace slag	52,705	33,407	36.6
Total	195,174	289,342	**48.2**
Central Eastern:			
Sand and gravel	287,913	348,247	**21.0**
Crushed stone	224,149	197,674	11.8
Furnace slag	157,607	323,804	**105.5**
Total	669,669	869,725	**29.9**
Pocahontas:			
Sand and gravel	101,714	97,921	3.8
Crushed stone	82,561	56,307	31.8
Furnace slag	346	10,511	**2,937.9**
Total	184,621	164,739	10.8
Southern:			
Sand and gravel	950,751	1,184,558	**24.6**
Crushed stone	707,608	818,771	**15.7**
Furnace slag	79,837	115,653	**44.9**
Total	1,738,196	2,118,982	**21.9**
Northwestern:			
Sand and gravel	65,727	194,210	**195.5**
Crushed stone	31,692	154,330	**387.0**
Furnace slag	229	860	**275.5**
Total	97,648	349,400	**257.8**
Central Western:			
Sand and gravel	555,076	879,394	**58.4**
Crushed stone	296,809	351,517	**18.4**
Furnace slag	422	2,309	**447.2**
Total	852,307	1,233,220	**44.7**
Southwestern:			
Sand and gravel	855,568	1,018,687	**19.1**
Crushed stone	388,082	334,606	13.8
Furnace slag	4,342	5,140	**18.4**
Total	1,247,992	1,358,433	**8.8**

[1] Compiled from reports of the Interstate Commerce Commission.
[2] Figures for 1934 are subject to revision.

space of residential contracts increased 41.0 per cent. in the first quarter of 1934 but the actual volume of residential construction in both 1933 and 1934 has been so small that this increase can not be interpreted as a building revival. Engineering-construction contract awards were 41.7 per cent. higher from January to March, 1934, than in 1933.

Regional Shipments Increase.—Table II and Fig. 2 show railway shipments of aggregates by regions. Only Pocahontas recorded a decline in 1934, total shipments dropping from 184,621 short tons in 1933 to 164,739 short tons in 1934. Increases recorded in other regions ranged from 8.8 per cent. in the Southwestern region to 257.8 per cent. in the Northwestern. Slag shipments were reported in every region but New England and in general, except for Great Lakes, showed large increases over 1933.

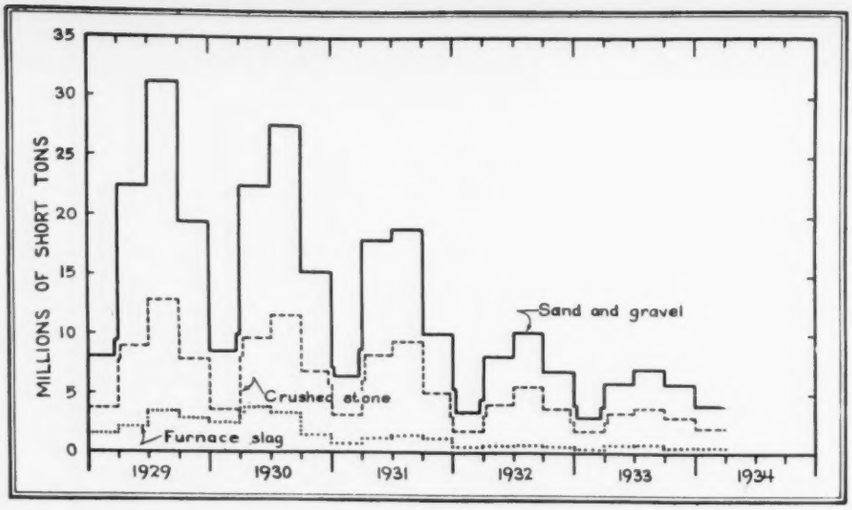


Fig. 1. Quarterly trends in railway movement of aggregates as indicated by revenue shipments of sand and gravel, crushed stone and slag, non-revenue railroad ballast, fluxing stone and glass and molding sand are not included.

Road Bill *(from page 22)*

extensions thereof or on secondary or feeder roads."

Sec. 12.—After June 30, 1935, Federal aid shall be extended only to those states that continue to use for roads at least whatever portions of their gasoline taxes and motor vehicle license fees are now authorized by law for highway purposes (including retirement of outstanding bonds for payment of which these revenues may have heretofore been pledged), provided that in no case shall the provisions of this section operate to deprive any state of more than one-third of the amount to which that state would be entitled.

Sec. 13.—Limitations upon highway construction within cities and upon payment per mile from federal funds shall hereafter not apply.

Sec. 14.—No deductions shall hereafter be made on account of prior advances or loans to states for emergency highway construction or for furnishing relief or work relief.

Sec. 15.—Provision is made for the continuation of coöperative surveys for a proposed inter-American highway and authority given the Secretary of Agriculture to expend not more than $75,000 to pay the costs incurred.

Atlas Powder and Giant Powder Companies Merge

Effective June 26, the Atlas Powder Co. and its totally-owned subsidiary, The Giant Powder Co., Cons., San Francisco, Cal., were combined and following this date all Giant business will be conducted under the name of Atlas Powder Co., Giant Division.

Giant personnel, sales policies, and office locations remain unchanged. The main office of the Giant Division is at San Francisco, with other offices at Seattle, Washington; Los Angeles, Cal.; Portland, Ore.; Spokane, Wash.; Salt Lake City, Utah; and Butte, Mont. Manufacturing facilities are continued at Giant, Cal., and Giant brands well known to dynamite users in western states will be continued.

The Atlas Powder Co. general offices are located at Wilmington, Del., with branch offices or sales offices in all parts of the country and sales agencies in Latin American countries, Hawaii, the Philippines and Alaska.

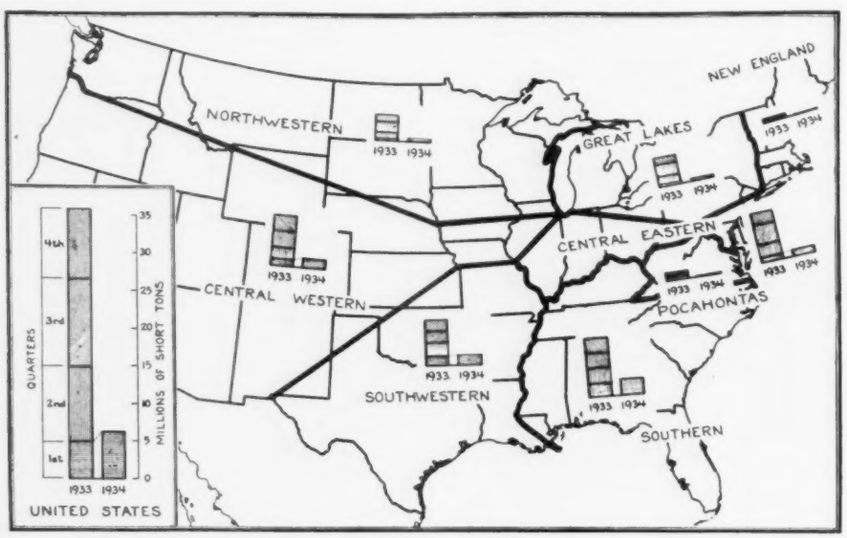


Fig. 2. Quarterly shipments of aggregates on Class I railroads in 1933 and 1934, by regions.

Correspondence

Government Competition With Commercial Plants

To the Editor:

The towns, cities, counties and states are actively in competition with tax-paying commercial aggregates plants. In almost every county workhouse or county labor is being employed in such competition, while the officials of these political subdivisions are calling upon the Federal government for aid to assist in relief for the unemployed.

This practice has not saved money for the divisional governments mentioned and it has cost the commercial plants and free labor plenty. Why not ask the Federal government to look into this and require some coöperation from states, counties and cities before this relief is granted?

H. E. RODES, *Chairman,*
Regional Committee No. 6.
Nashville, Tenn.

Production for Profit

To the Editor:

I have just found on my desk a copy of PIT AND QUARRY for February, 1934. I have read with a tremendous amount of interest the editorial in this issue. [Is Production for Profit Doomed?] It is a most excellent statement, and your conclusions are most highly commendable. Personally, I feel that the editorial is worthy of being reprinted and circulated. May I congratulate you upon its excellence?

ISADOR LUBIN,
Commissioner of Labor Statistics,
Bureau of Labor Statistics,
United States Dept of Labor.
Washington, D. C.

Latest Portland-Cement Statistics

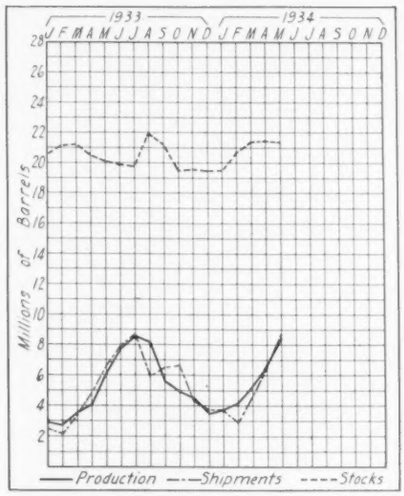


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1933, to May, 1934.

THE Portland-cement industry in May, 1934, produced 8,554,000 bbl., shipped 8,731,000 bbl. from the mills, and had in stock at the end of the month 21,345,000 bbl. Production in May, 1934, showed an increase of 36.6 per cent. and shipments an increase of 30.1 per cent., compared with May, 1933. Stocks at the mills were 6.1 per cent. higher than a year ago.

The statistics here given are compiled from reports for May, received by the Bureau of Mines, from all manufacturing plants except one, for which an estimate has been included.

In the following table the total output of finished cement is compared with the estimated capacity of 163 plants at the close of May, 1934, and of 164 plants at the close of May, 1933.

RATIO OF PRODUCTION TO CAPACITY (*per cent.*)

	May		April	March	Feb.
	1933	1934	1934	1934	1934
The month..	27.4	37.5	29.6	23.0	20.2
The 12 months ended	26.0	26.7	25.9	25.0	24.4

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1933 AND 1934 (*In thousands of barrels*)

Month	Production		Shipments		Stocks At End of Month	
	1933	1934	1933	1934	1933	1934
January	2,958	3,779	2,502	3,778	20,624	19,547
February	2,777	4,168	2,278	2,952	21,125	20,762
March	3,684	5,257	3,510	4,618	21,298	21,422
April	4,183	6,544	4,949	a6,492	20,542	a21,523
May	6,262	8,554	6,709	8,731	20,117	21,345
June	7,804	.....	7,979	.....	19,936	.....
July	8,609	.....	8,697	.....	19,848	.....
August	8,223	.....	5,994	.....	22,078	.....
September	5,638	.....	6,517	.....	21,216	.....
October	5,037	.....	6,750	.....	19,502	.....
November	4,672	.....	4,463	.....	19,709	.....
December	3,526	.....	3,738	.....	a19,541	.....
Totals	63,373	.....	64,086	.....	.....	.....

a Revised.

DISTRIBUTION OF CEMENT (*a*)

Shipped to—	April		May		Shipped to—	April		May	
	1933	1934	1933	1934		1933	1934	1933	1934
Alabama	117,113	41,036	130,896	56,284	New Jersey	184,998	216,336	252,625	252,487
Alaska	1,074	823	903	2,774	New Mexico	39,006	24,520	11,972	32,875
Arizona	10,305	25,810	13,226	22,759	New York	503,554	643,533	874,417	923,702
Arkansas	77,517	50,320	83,686	63,139	North Carolina	39,612	52,706	41,121	61,300
California	410,282	455,368	489,827	472,667	North Dakota	12,777	19,823	17,159	36,042
Colorado	35,589	57,863	30,148	59,402	Ohio	200,272	304,617	292,022	443,918
Connecticut	45,492	71,645	123,156	112,171	Oklahoma	170,719	118,919	155,381	157,029
Delaware	32,078	24,046	47,636	38,443	Oregon	35,296	54,599	44,353	37,852
Dist. of Col	73,324	68,391	91,904	67,170	Pennsylvania	353,170	400,087	498,529	544,402
Florida	58,331	107,267	73,109	88,562	Porto Rico	9,613	6,500	7,191	10,132
Georgia	64,568	82,820	53,172	72,012	Rhode Island	20,577	28,604	47,818	39,543
Hawaii	14,145	22,278	11,044	23,741	South Carolina	26,081	23,213	26,530	24,582
Idaho	10,062	15,875	11,455	19,432	South Dakota	17,808	27,492	34,370	43,874
Illinois	171,203	386,683	177,861	671,643	Tennessee	136,572	172,536	128,277	172,233
Indiana	108,666	175,352	172,464	335,335	Texas	354,811	302,929	360,532	347,606
Iowa	97,511	162,107	193,695	376,296	Utah	16,320	39,860	15,926	41,514
Kansas	90,448	197,528	81,970	193,532	Vermont	10,431	17,466	13,794	39,800
Kentucky	113,952	126,330	149,151	187,223	Virginia	91,407	111,332	100,649	128,834
Louisiana	48,230	104,635	64,344	103,895	Washington	67,365	115,953	52,800	125,718
Maine	15,658	20,734	33,625	27,518	West Virginia	59,766	72,429	54,844	134,170
Maryland	81,995	103,993	78,427	136,713	Wisconsin	90,703	137,572	178,181	291,111
Massachusetts	94,101	145,552	193,170	185,865	Wyoming	5,608	10,914	8,131	16,617
Michigan	98,938	195,229	295,721	423,275	Unspecified	11,306	4,193	5,235	5,597
Minnesota	108,377	106,896	210,463	149,171		4,866,087	6,437,141	6,634,362	8,742,909
Mississippi	45,380	73,716	50,862	62,712	Foreign countries	82,913	54,859	74,638	41,091
Missouri	140,758	230,971	227,115	327,619					
Montana	14,012	19,817	20,183	32,594	Total shipped from cement plants	4,949,000	6,492,000	6,709,000	b8,784,000
Nebraska	173,435	127,795	225,751	198,856					
Nevada	41,035	308,963	51,316	284,406					
New Hampshire	14,736	21,165	26,225	36,762					

a Includes estimated distribution of shipments from 2 mills in May, 1934, from 3 mills in April and May 1933 and in April 1934. *b* Revised.

Landa Cement Company Now Cementos Atoyac

The Compania de Cemento Portland Landa, S.A., Puebla, Mexico, has changed its name to Cementos Atoyac, S.A., effective June 15. The officers of the new company continue as follows: F. J. Miller, president and general manager; Alton J. Blank, general superintendent and supervising chemist; John A. Blank, consulting chemist; A. P. Hughes, chief accountant; W. Jenkins, chief clerk.

Correction

John W. Stockett, Jr., of the Chemical Dept. of the National Lime Assn., wishes to have corrected some misstatements which occurred in the report of his discussion of a *Proposed Water-Softening Campaign* contained in the account of the lime convention in PIT AND QUARRY for June. The sentence of the report reading, "To soften 1,000,000 gal. of water—that is, to reduce the number of its hard parts to 75 in 1,000,000—requires 10.7 lb. of lime," should have said that 10.7 lb. of lime is required per 1,000,000 gal. of water to reduce the hardness by 1 part per 1,000,000.

In the statement reading, "Water having 75 parts (of hardness salts) per 1,000,000 is suitable for drinking, but may not be economical for industry," the last half of the sentence should have said, "as well as economical for other uses."

The report on conditions in Milwaukee referred to the city's "sewage-treatment plant," whereas "water-treatment plant" was intended.

U. S. Gypsum Co. Enlarges Kansas City Warehouse

The U. S. Gypsum Co. has arranged to increase its warehousing and distribution branch in Kansas City, Mo., up to 18,000 square feet. The building leased was formerly used for railway mail service, so its layout is ideal for excellent train service, permitting trackside loading and unloading. The company will warehouse its construction materials, specialties and other products in this newly obtained building. Manufacturing plants belonging to this company are located in North Kansas City.

Boulder Dam Described in Illustrated Booklet

An interesting booklet describing Boulder Dam has just been published by the Boulder Dam Service Bureau, Inc., Boulder City, Nev. It is well illustrated and includes line drawings showing the plan and a longitudinal section of the project. The various operations are described, as well as the aggregates and concrete plants.

Labor Conditions

THE gains in employment reported for the nonmetallic-mineral industries in February were continued in March, the latest month for which data are available.

Quarrying Industry.—From a high point of 36,894 employees reported by 1,202 plants for last October employment fell to 28,610 for 1,180 plants in March. This month, however, showed an increase of 8.3 over the February figure of 26,561 in 1,192 plants and a gain of 19.7 per cent. over March, 1933 (Table I). The employment index was 42.0, taking the 1923-1925 3-yr. average as 100.

One-week pay-rolls, which were $566,803 in December, fell to $368,224 in January, but rose again in February to $374,577. The pay-roll index (based on the 1923-1925 average as 100) rose 14.8 per cent. compared with February and 35.4 per cent. compared with March, 1933.

Per-capital weekly earnings reached an average of $15.19 in March, an increase of 5.9 per cent. over February's figure and 13.2 per cent. over that of March of last year. This is the highest point reached since last July except October, when the figure was $15.36. Both the average hours worked per week and the average hourly earnings were higher in March than in February—the former by 6.3 per cent. and the latter by 0.7 per cent. Average hourly earnings, 45.6 c., were 17.7 per cent. above March, 1933, although lower than in last December.

Increases in wage rates continued to be a part of the employment picture in March. However, the number of such increases and the number of employees affected by them continued to decline (Table II), reflecting undoubtedly the extent to which compliance with code wage requirements was being perfected. Besides raising the wage rates of those formerly employed at less than code minima, operation under the code has had the effect of raising higher wages to a similar but not equal extent. The number of plants in which wage-rate increases were made effective was 12 in December, 6 in January, 3 in February, and only 1 in March. The number of workers affected fell from 214 in December to 68 in January and to 25 in February. The single increase reported in March affected 60 workers.

August and September, 1933, were the months of greatest wage-rate increases. In August 4,915 workers were affected by increases in 109 plants, and in September 3,052 workers in 93 plants. These changes reflected the improving conditions in the quarrying industry. In the 9 months —July, 1933, to March, 1934, inclusive —10,089 workers of the average of 31,050 employed received wage-rate increases, or 32.4 per cent.

A comparison of employment and pay-rolls in 1,177 identical plants employing 29,148 workers for February and March is given in Table III. In some states, such as Oregon and Maine, employment increased more than 100 per cent. in one month. In several states (Delaware, Michigan, Nebraska, New Hampshire, New York, North Carolina, South Dakota, Texas and Washington) the increases ranged from 20.3 per cent. to 78.0 per cent. Losses, ranging from 2.0 per cent. in California to 31.3 per cent. in

Table I.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
July	1,134	33,044	49.5	**4.8**	[2]	$498,991	28.4	**3.6**	2.4	$15.10	1.2	2.4	41.4	**.4**	.....	37.2c.	1.0	.....
August	1,142	34,553	57.6	**4.2**	**1.0**	520,098	29.9	**5.1**	**.7**	15.05	**.9**	.3	38.7	7.0	.....	40.4c.	**8.8**	.....
September	1,152	35,442	52.6	**1.9**	**.4**	516,932	29.3	2.0	3.9	14.59	3.8	4.3	34.4	1.11	.....	42.8c.	7.1	.....
October	1,202	36,894	53.2	**1.1**	**1.5**	566,803	31.2	**6.4**	**3.7**	15.36	**5.2**	**2.1**	34.8	**1.4**	.....	44.7c.	**3.5**	.....
November	1,185	34,303	51.1	3.9	**3.4**	497,238	28.3	9.3	**4.4**	14.50	5.5	**.9**	32.5	6.6	.....	45.2c.	**1.1**	.....
December	1,162	30,658	45.3	11.3	**7.1**	434,751	24.4	13.7	**10.4**	14.18	2.7	**3.3**	31.3	3.7	.....	46.1c.	**.9**	.....
1934																		
January	1,144	26,217	39.7	12.5	**13.1**	368,224	21.3	12.6	**17.7**	14.05	.1	**4.1**	30.8	1.9	.....	45.6c.	**.2**	.....
February	1,192	26,561	38.8	2.2	**11.5**	374,577	21.0	1.5	**20.7**	14.10	**.7**	**8.2**	31.1	**1.3**	.....	45.4c.	[2]	.....
March	1,180	28,610	42.0	**8.3**	**19.7**	434,572	24.1	**14.8**	**35.4**	15.19	**5.9**	**13.2**	33.5	**6.3**	2.7	45.6c.	**.7**	**17.7**
April	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
June	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Before March 1, 1934, the index numbers were based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.
[2] No change.

Table II.—CHANGES IN WAGE RATES IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
July 15	1,144	26,217	1,138	26,149	6	68	.....	.....
Aug. 15	1,142	34,553	1,033	29,638	109	4,915	.....	.....
Sep. 15	1,152	35,442	1,059	32,390	93	3,052	.....	.....
Oct. 15	1,202	36,894	1,179	35,305	21	1,516	2	73
Nov. 15	1,185	34,303	1,178	34,132	7	171	.....	.....
Dec. 15	1,162	30,658	1,149	30,431	12	214	1	13
Jan. 15	1,144	26,251	1,138	26,149	6	68	.....	.....
Feb. 15	1,192	26,561	1,189	26,536	3	25	.....	.....
Mar. 15	1,180	28,610	1,179	28,550	1	60	.....	.....
Apr. 15	.....	.....	.....	.....	.....	.....	.....	.....
May 15	.....	.....	.....	.....	.....	.....	.....	.....
June 15	.....	.....	.....	.....	.....	.....	.....	.....

Table V.—CHANGES IN WAGE RATES IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Number of Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
July 15	122	16,072	108	13,482	14	2,590	.....	.....
Aug. 15	111	15,787	60	5,081	51	10,706	.....	.....
Sep. 15	129	15,545	126	15,451	3	94	.....	.....
Oct. 15	131	13,199	128	12,609	3	510	.....	.....
Nov. 15	113	10,071	113	10,071	.....	.....	.....	.....
Dec. 15	129	10,851	129	10,851	.....	.....	.....	.....
Jan. 15	121	9,495	121	9,495	.....	.....	.....	.....
Feb. 15	125	12,745	125	12,745	.....	.....	.....	.....
Mar. 15	120	13,023	120	13,023	.....	.....	.....	.....
Apr. 15	.....	.....	.....	.....	.....	.....	.....	.....
May 15	.....	.....	.....	.....	.....	.....	.....	.....
June 15	.....	.....	.....	.....	.....	.....	.....	.....

Virginia, were reported in other states.

Generally speaking, pay-rolls rose faster than employment, indicating the presence of higher wage rates or longer work weeks or both. In some cases where employment declined, pay-rolls increased, as in Alabama, California, Missouri and South Carolina. In a few cases where employment increased, pay-rolls declined, as in Arizona, Connecticut, Massachusetts and Utah.

Cement Industry.—In March 120 cement mills reported 13,023 employees on their pay-rolls, an increase of 3.4 per cent. over February and 30.1 per cent. over March, 1933 (Table IV). The employment index, which stood at 37.6 in February, moved up to 42.4 in March, taking the 1926 figure as 100.

February 1-week pay-rolls (Table IV) reached $212,111, as compared with only $164,507 in January, a gain of 16.2 per cent. for the month and 39.6 per cent. for the year. The pay-roll index rose from 17.9 in January to 20.8 in February (based on 1926 levels). In March the index was 24.1 (based on the 1923-1925 average), a gain of 7.0 per cent. for the month and 46.1 per cent. for the year.

Per-capita weekly earnings (Table IV) rose from a "low" of $15.86 in December, 1933, to $17.22 in March. The latter figure, although higher than that for February by 3.5 per cent., is lower than the October "high" of $18.37, due to the fact that the average hours worked per week were lower in March (31.9) than in October (34.5) and the average hourly earnings declined slightly (from 54.3 c. in October to 53.6 c. in March). Compared with March, 1933, however, March of this year was 11.7 per cent. higher in per-capita weekly earnings and 29.9 per cent. higher in average hourly earnings but 10.6 per cent. lower in the average hours worked per week.

Wage rates in the cement industry show no changes this year (Table V). The increases recently announced by various cement companies either came too late to affect the March records or occurred in plants not reporting on wage-rate changes. The period of wage-rate increases, which ran through the summer of 1933, ended in October. The increases made effective in July, August, September and October of last year affected 13,900 workers of the average of 15,151 workers employed, or 91.7 per cent.

Table III.—COMPARISON OF EMPLOYMENT AND PAY-ROLLS IN IDENTICAL QUARRY AND NONMETALLIC-MINING ESTABLISHMENTS, IN FEBRUARY AND MARCH, 1934, BY STATES

(Gains are shown in bold-faced type, losses in light-faced type)

State	Number of Establishments	Number on Pay-Roll, March, 1934	Percentage of Change from February, 1934	Amount of Pay-Roll (1 week) March, 1934	Percentage of Change from February, 1934
Alabama	16	625	2.6	$ 7,222	**3.6**
Arizona	3	32	**2.4**	588	9.0
Arkansas	9	232	**5.0**	3,034	**12.2**
California	51	1,012	2.0	20,985	**5.9**
Colorado	4	16	**14.3**	240	**34.8**
Connecticut	18	158	**10.5**	2,092	14.4
Delaware	3	62	**93.8**	936	**65.4**
District of Columbia					
Florida	16	787	**13.6**	9,802	**7.0**
Georgia	25	1,357	**3.4**	13,328	**8.9**
Idaho					
Illinois	23	557	3.0	9,182	5.2
Indiana	70	1,216	**2.4**	17,937	**11.3**
Iowa	28	369	**11.8**	5,380	**14.9**
Kansas	36	1,331	**3.7**	24,997	**5.3**
Kentucky	37	894	**6.9**	9,571	**7.5**
Louisiana	6	427	4.3	5,481	5.1
Maine	7	37	**184.6**	745	**67.0**
Maryland	14	239	**4.8**	2,953	.9
Massachusetts	20	275	**14.1**	5,731	**25.7**
Michigan	47	1,148	**25.2**	17,801	**26.6**
Minnesota	26	192	30.9	3,287	20.2
Mississippi	9	199	3.9	2,624	**3.5**
Missouri	43	824	**6.3**	11,428	**4.7**
Montana	8	45	**2.3**	791	**41.3**
Nebraska	10	77	**20.3**	864	**20.5**
Nevada					
New Hampshire	11	103	**77.6**	1,984	**168.1**
New Jersey	36	466	**4.7**	8,779	**16.4**
New Mexico					
New York	83	1,656	**25.5**	32,501	**22.8**
North Carolina	14	481	**30.7**	6,218	**54.2**
North Dakota					
Ohio	148	3,096	**11.9**	45,578	**16.1**
Oklahoma	16	161	6.9	1,584	12.8
Oregon	4	52	**116.7**	1,278	**154.6**
Pennsylvania	160	3,878	**9.5**	55,771	**15.1**
Rhode Island					
South Carolina	4	107	3.6	1,098	**4.6**
South Dakota	5	207	**75.4**	2,310	**36.0**
Tennessee	23	1,126	2.3	14,611	6.4
Texas	21	1,426	**28.6**	25,922	**36.5**
Utah	7	99	**3.1**	1,696	.8
Vermont	37	1,992	**1.9**	35,933	**8.1**
Virginia	30	732	31.3	8,349	.4
Washington	15	525	**78.0**	8,586	**69.9**
West Virginia	20	768	**9.7**	9,835	**26.8**
Wisconsin	14	151	**9.4**	2,602	**14.7**
Wyoming					
Totals	1,177	29,148		$441,634	

Table IV.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
July	122	16,072	46.1	**7.9**	**13.5**	$274,777	25.7	**9.8**	**6.6**	$17.10	**1.8**	6.3	38.9	1.5	.....	43.9c.	**3.4**	.....
August	111	15,787	48.8	**5.8**	**28.4**	287,508	29.5	**15.0**	**26.1**	18.21	**8.7**	1.5	36.0	7.4	.....	50.2c.	**17.0**	.....
September	129	15,545	44.0	9.7	**5.0**	256,836	23.9	19.0	2.4	16.52	10.4	7.3	31.8	11.6	.....	52.2c.	**3.9**	.....
October	131	13,119	38.0	13.7	11.4	240,984	22.9	4.5	9.1	18.37	**10.7**	**2.1**	34.5	**8.4**	.....	54.3c.	**4.0**	.....
November	113	10,071	37.8	.4	7.8	177,760	21.2	7.1	8.6	17.65	6.7	.8	32.0	7.2	.....	52.8c.	2.7	.....
December	129	10,851	33.6	11.3	**2.1**	172,067	17.6	17.1	**2.3**	15.86	6.6	**.2**	28.5	10.9	.....	54.2c.	**2.6**	.....
1934																		
January	121	9,495	32.6	2.8	**8.7**	164,507	17.9	**1.7**	**19.3**	17.33	**4.6**	**9.3**	31.4	**7.9**	.....	55.7c.	1.1	.....
February	125	12,745	37.6	**15.2**	**26.6**	212,111	20.8	**16.2**	**39.6**	16.64	**.8**	**10.2**	30.8	**4.1**	.....	53.1c.	1.7	.....
March	120	13,023	42.4	**3.4**	**30.1**	224,218	24.1	**7.0**	**46.1**	17.22	**3.5**	**11.7**	31.9	**4.6**	10.6	53.6c.	**.2**	**29.9**
April																		
May																		
June																		

[1] Before March 1, 1934, the index numbers are based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.

Traffic News and Comment

Recent I. C. C. Decisions

Cement.—In response to fourth-section application No. 15,295, the Commission has authorized parties to Johanson's I. C. C. 1,982, to establish and maintain for the transportation of cement, car-load minimum weight 60,000 lb., to Dewey, Okla.; (a) over all routes from St. Louis, Mo., and E. St. Louis, Ill., a proportional rate to apply on traffic originating east of the Illinois-Indiana state line, the same as the local or proportional rate concurrently in effect from Hannibal, Mo., to Dewey, Okla., but not less than 16 c. per 100 lb., and to maintain higher rates to intermediate points which are more than 323 mi. distant from St. Louis, Mo.; and (b) over circuitous routes from Hannibal, Mo., a rate the same as that concurrently in effect over the short line or route from and to the same points but not less than 16 c. per 100 lb., and to maintain higher rates to intermediate points which are more than 323 mi. distant from Hannibal; provided that rates to higher rated intermediate points shall not exceed the lowest combination of rates subject to the Interstate Commerce Act, and shall not be increased except as may be authorized by the Commission, and provided further that the relief authorized shall not apply to lines or routes over which the distance exceeds the direct line distance from Hannibal, Mo., to Dewey, Okla., by more than 50 per cent.—I. C. C. F. S. O. No. 11,573.

Sand and Gravel.—Finding the rates on sand and gravel from Oreapolis, Neb., to Afton and Thayer, Ia., charged on shipments made during June, July and August, 1930, not unreasonable, the Commission has dismissed the complaint in I. C. C. Docket No. 25,922, Capital Construction Co. *v.* C. B. & Q.

Finding the rates on sand and gravel from Louisville, Neb., to Atlantic and Lorah, Ia., not unreasonable, the Commission has dismissed the complaint In I. C. C. Docket No. 26,034, C. F. Lytle Construction Co, *v.* C. R. I. & P.

Upon reconsideration the Commission has reversed the decision in 192 I. C. C. 405 as to the Virginia intrastate rates on sand and gravel. In the original report dealing with the rates on sand and gravel from Elizabethton and Siam, Tenn., to destinations in Virginia, south and west of Roanoke, the Commission found that the Virginia intrastate rates were unduly preferential of shippers in intrastate commerce and unduly prejudicial to shippers in interstate commerce. The new report on reconsideration says that the record did not support a finding of undue prejudice under Sec. 3 and 13.—I. C. C. Docket No. 24,840, East Tennessee Sand & Gravel Co. *v.* Southern *et al.*, and Sub. No. 1, American Limestone Co. *v.* Southern *et al.*

New Complaints Filled

The Commission has suspended from June 3, 1934, to Jan. 3, 1935, the following supplements to Johanson's Tariffs: Supplement 21 to I. C. C. 2,560; No. 62 to I. C. C. No. 2,458; No. 4 to I. C. C. 2,586; No. 38 to I. C. C. 2,535; No. 31 to I. C. C. 2,531; No. 64 to I. C. C. 2,509 and Supplement No. 94 to Speiden's I. C. C. No. 1,354. The proposed schedules would revise the rates on lime from, to and between points in southwestern and Kansas-Missouri territories, by cancelling the present commodity rates and applying in lieu thereof 16 per cent. of first-class on a car-load minimum weight of 30,000 lb., and 13½ per cent. of first-class on a car-load minimum weight of 50,000. This would result in both increases and reductions. A revision of lime rates in this territory some time ago led to a suspension proceeding in which the Commission found the proposed rates not justified and recommended a scale of rates to be applied. The schedules now under suspension propose higher rates than those recommended by the Commission in the former proceedings.—I. C. C. I. & S. Docket No. 3,994.

Sand.—A cease-and-desist order and waiver of alleged undercharges is sought on a complaint charging violation of Sec. 1 and 6 in connection with the rate on sand from Provincetown, Mass., to Detroit, Mich., in I. C. C. Docket No. 26,532, Whitehead Bros. Co., New York, N. Y. *v.* N. Y. N. H. & H. *et al.*

A new rate and reparation is sought on an allegation of violation of section in connection with the rate on sand from Ottawa, Ill., to Louisville, Ky., in I. C. C. Docket No. 26,534, Standard Sanitary Mfg. Co., Pittsburgh, Pa. *v.* C. & E. I. *et al.*

Examiners' Reports

Sand.—After further hearing for the purpose of enabling the Commission to determine which shipments of sand and gravel, from and to points on the C. & N. W. and the C. M. & St. P., if any, were overcharged and the amount of such overcharges, Examiner J. Edgar Smith has criticized severely the defendants for attempting to retry the application of the Jones' rule for constructing combination rates, instead of supplying the evidence necessary to prove the amount of reparation due, which complainants allege was more than $45,000. In his proposed report the examiner said, "There are before the Commission now only two questions: (1) Which shipments if any were overcharged? (2) The amount of such overcharge. Complainants have dragged these questions through nearly 600 p. of alleged testimony over a period in excess of five years and have not even attempted to answer the first question. The record, since Dec. 21, 1928, can only be characterized as a pertinaceous attempt to retry the application of the Jones' rule; to inject misrouting, where under the tariff no misrouting was possible; and to obtain what the Commission denied, 'rehearing, reconsideration, or amendment.' These complaints should be dismissed."—I. C. C. Docket No. 16,747, George W. Pyott Sand and Gravel Co. *et al.* and Sub. No. 1, American Sand & Gravel Co. *v.* Belt Railway of Chicago *et al.*

In 188 I. C. C. 99 the Commission found the rate on glass sand from Mapleton, Pa., to Rochester, N. Y., unreasonable. On further hearing Examiner J. G. Cooper recommends that the Commission find reparation due complainants from the Pennsylvania of $55.24 and from the Pennsylvania and New York Central of $8,813.78.—I. C. C. Docket No. 23,340, F. E. Reed Glass Co. *v.* Pennsylvania *et al.*

Rate-Committee Dockets

New England Freight Assn.

Agricultural Lime and Limestone.—To permit the movement of the traffic involved shippers are asking that the rates on agricultural lime and ground burned or unburned limestone, car-load minimum weight 40,000 lb., from Winooski, Vt., be reduced to Ogdensburg to Madrid inclusive to $2.00; Norwood to Churubusco, $1.90; Clinton Mills to Chaplain, $1.80 per net ton.—Docket No. 33,041.

Shippers propose that the rates on agricultural lime and limestone in straight or mixed cars, car-load minimum weight 50,000 lb., to St. Leonard, N. B., from Winooski, Vt., from 52 c. and from Fonda Jct., and Swanton, Vt., from 46 c. to 22 c. per 100 lb.—Docket No. 33,046.

Trunk Line Assn.

Cement.—Carriers are proposing reductions in the rates on cement and cement mixtures (consisting of cement and common sand) in boxes with car-loads of cement, from all cement-shipping points in the Lehigh district in Docket No. 32,421, as follows:

	Proposed	Present
Erie, N. R. R. of N. J., B. R.		
Fairview, N. J.	10 c.	12 c.
Ridgefield, N. J.	10 c.	12 c.
Palisades Park, N. J., N. J. & N. Y. R. R.	10 c.	12 c.
North Hackensack, N. J. to Pearl River, N. Y.	12 c.	12½ c.

Carriers propose a rate on cement from Alsen, N. Y., to Haverstraw, N. Y., of 10½ c. per 100 lb.—Docket No. 32,424.

Shippers propose rates on cement, car-load minimum weight 50,000 lb., from the Lehigh district to Blackwood, N. J., of 13 c., and from Swedeland and West Conshohoken, Pa., of 10½ c., per 100 lb.—Docket No. 32,445.

A reduction in the rate on cement, also cement mixtures (consisting of cement and common sand) in mixed car-loads with cement, car-load minimum weight 50,000 lb., from Manheim, W. Va., to Plumville, Pa., from 21 c. to 15 c. per 100 lb., is proposed by shippers.—Docket No. 32,467.

Crushed Stone.—Shippers propose a rate of $1.60 per net ton to apply on crushed stone [1], but not to apply on agricultural limestone or fluxing stone, from Steelton, Pa., to Queponco, Md., also to Snow Hill to Scarboro, Md., also to Westover to Oil Siding, Md., also to Costen to Lecato, Va., also to Ocean City to St. Martins, Md., also from Bleumont, Md., to Ocean City to St. Martins, Md.—Docket No. 32,495.

Lime.—Shippers propose a line of rates on building lime, agricultural or chemical lime, car-load minimum weight 30,000 lb., and on ground limestone, car-load minimum weight 50,000 lb., from Binnewater and Rosendale, N. Y., to stations on the L. & H., a statement of which will be furnished on request.—Docket No. 32,430.

Plaster.—Carriers propose to publish on (a) plaster and related articles and on (b) plasterboard car-load minimum weight 40,000 lb., from Akron, N. Y., and grouped points to P. R. R. destinations, Cuba to Canawaugus, N. Y., and to Garbutt, N. Y., a rate of (a) 12 c. and (b) 14 c. per 100 lb.—Docket No. 32,340.

Carriers propose to publish from the above points to P. & L. E. stations, Demmler Transfer, to Riverton, Pa., and Glassport to Gibsonton, Pa., rates of (a) 16 c. and (b) 17½ c. per 100 lb.—Docket No. 32,435.

Central Freight Assn.

Cement.—Carriers propose a revision of the rates on cement from Castalia and Osborn, O., and from Cement City, Mich., to destinations in eastern Ohio and western Pennsylvania, resulting in both increases and reductions. A statement of the proposed rates will be furnished on request.—Docket No. 39,873.

Carriers propose to reduce the rates on cement from Bay City, Mich., to Iron River, Mich., to 17 c. and to Scott Lake, Mich., and Johnson Spur, Wis., to 16 c. per 100 lb.—Docket No. 40,032.

A reduction in the rate on cement from Speed, Ind., to Robbinsville, N. C., and points taking same rates from 25 c. to 20½ c. per 100 lb., is proposed by shippers.—Docket No. 40,048.

Crushed Stone.—The following rates are proposed by shippers to apply on crushed stone from (C) Carey, (M) Marion and (O) Owens, O., to Peytonia, Danville and Marmet, W. Va.—Docket No. 39,962.

	(C)	(M)	(O)
Peytonia, W. Va.	$1.85	$1.75	$1.70
Danville, W. Va.	1.85	1.75	1.75
Marmet, W. Va.	1.80	1.70	1.70

Shippers at Henlein, Pa., have proposed

(*Continued on page 58*)

Foreign Developments

German Works Out Ratios of Square to Round Holes

Proposed German standard specifications of sand, gravel and crushed rock call for designation of sizes in terms of the screen which a specific size passes and the screen on which it is retained, and the use of wire-mesh screens in determining sizes. As many German plants use perforated-plate screens with round holes, an inspector of the German State Railway, Rothfuchs at Kassel, has worked out by comparative screen tests the ratios between round-hole and square-mesh screens which in operation yield stone of equivalent sizes. This relationship is not a constant ratio applying to all sizes, as some have asserted; Rothfuchs finds that the ratio of the diameter of a round hole to the width of a square mesh moves gradually from 1:0.70 at 1 mm. to 1:0.87 at 70 mm. (round hole). Here is his complete series:

Diameter Round-Hole d *(mm.)*	Mesh Width w *(mm.)*	Ratio d : w
1	0.7	1 : 0.70
2	1.5	1 : 0.74
3	2.3	1 : 0.75
5	3.8	1 : 0.76
7	5.4	1 : 0.77
8	6.2	1 : 0.77
10	7.8	1 : 0.78
12	9.5	1 : 0.79
15	12.0	1 : 0.80
20	16.4	1 : 0.82
25	20.8	1 : 0.83
30	25.2	1 : 0.84
40	34.0	1 : 0.85
50	43.0	1 : 0.86
60	52.0	1 : 0.87
70	61.0	1 : 0.87

The study is reported in *Steinindustrie* 28:262-263, Dec. 31, 1933.

Japan Furnishes Most of China's Imported Cement

The principal cement plants in China are those of the Shanghai Portland Cement Co., Nanking; the Chee Hsin Cement Co., Tangshan; and the Kwantung Cement Works, Kwantung. The total production of the Chinese cement industry at the present time amounts to 2,300,000 bbl. a year, while the country's annual consumption needs are from 2,500,000 to 3,000,000 bbl. yearly. The difference is imported from abroad, and especially from Japan.

In spite of a new tariff of $1.63, Japanese imports continue to increase. In the first ten months of 1933 the imports from Japan were 397,077 *piculs* as against 236,442 in the same period of the preceding year. In the same time the value of imports dropped 24,967 gold units, a fact pointed to as evidence of Japanese dumping. In the first half of last year the average price of Japanese cement ("Hei Lung" and "Black Dragon" brands) on the Chinese market stood at $4.00 per bbl. of 375 lb., while the most available Chinese brands ("Horse," "Chee Hsin," "Tai Shan," "China," and "Elephant") cost $6.70. Recently the Japanese have been selling direct to contractors and other large buyers, and unless some way is found to combat the inroads of this competition the Chinese cement industry faces a prospect of a disastrous drop in its sales.—*Tonindustrie-Zeitung*, 58:373, April 12, 1934.

pH Value in Relation to Cement Set and Strength

Checking various theoretical studies of the effect of acid and alkaline conditions, respectively, on the set of cement, the author tested the strength and setting time of commercial cements in mixes gauged with water varying from pH 2 to 12.5, obtaining the acid and alkaline conditions with the aid of HCl and NaOH, respectively. The time of set is accelerated as the pH increases; the strength increases slightly from low pH until the solution is about neutral and then falls rather rapidly.

Similar tests on the setting of lime showed that the setting time of lime is accelerated as the pH increases from 3.5 to about 6, and then is retarded again as the solution increases in alkalinity.—Maurice Déribéré in *Revue des Materiaux de Construction* No. 293:33-35, Feb., 1934.

Kühl Proposes Arranging Cements in Four Classes

The problem of standards and standard specifications for cement is perpetual. Germany has since 1932 had a new set of cement standards, the elaboration of which began in 1922 and was prosecuted with customary German thoroughness. Nevertheless, such standards and standard specifications are not an end in themselves, but rather an instrument for the perfection of concrete-construction methods, and the door is by no means closed to further work toward their improvement.

Dr. Hans Kühl, reviewing this question in a series of articles in *Zement* (23:155-158, 187-190, 223-229; March 22, April 5 and 19, 1934), emphasizes the need for the development of standards for cements of varying types based on the varying needs of construction (present types, as differentiated in the standards, are predicated either on difference of origin —Portland cement, fused aluminous cement, blast-furnace cement, etc.—or of strength properties only). In Sweden there is a trend toward differentiating between cements for hydraulic construction and cements for building construction. In the United States Bates has suggested the development of seven types of cement with special properties.

Kühl proposes to differentiate: (1) "reinforced-concrete cement," to harden rapidly and attain high strength; (2) "road-building cement," as high as possible in elasticity and as low as possible in tendency toward shrinkage; (3) "massive-construction cement," to harden slowly and to heat as little as possible during the hardening process; (4) "corrosion-resisting cement," with especial resistance to chemical attack.

Such a specialization of cements according to specific properties would call for a sharpening of additional tests; in addition to those now used in the standard specifications (fineness of grinding, setting time, soundness and strength) it would be necessary to develop standard tests for tendency to shrinkage, elasticity, development of heat and resistance to chemical attack. The knowledge developed during such investigations should also result in a broadening of the requirements concerning the chemical composition of the cements.

Equation for Hydrolysis of Tricalcium Silicate

In an investigation of the hydrolytic decomposition of tricalcium silicate it was determined that at normal pressure and temperature conditions in the system $CaO - SiO_2 - H_2O$ the solid phase in equilibrium with the crystalline calcium hydrate shows the composition $5CaO.3SiO_2.aq$. The process of hydrolysis can accordingly be expressed by the equation:

$3(3CaO.SiO_2) + aq = 5\ CaO.3SiO_2.aq + 4Ca(OH)_2$.—B. Tavasci in *Annali di Chimica Applicata* 23, No. 9, and *Tonindustrie-Zeitung* 58:274, March 12, 1934.

As a service to its readers PIT AND QUARRY *is prepared to supply, at the actual cost of labor and materials, an English translation of any paper abstracted in this magazine. In the case of illustrated papers or articles photostatic reproductions of the illustrations will accompany the translations. Prices will be quoted on request.*

Recent Patents

AMERICAN

Concrete

Apparatus for agitation of concrete. Harry B. Jones, Chicago, Ill., assignor to National Equipment Corp. No. 1,952,922.

Concrete conveying and mixing machine. Harry Westberg and Lawrence E. McCormack, Los Angeles, Calif. No. 1,953,091.

Concrete mixing and distributing apparatus. Frederic E. Bager, South Milwaukee, Wis., assignor to T. L. Smith Co. No. 1,954,860.

Crushing and Pulverizing

Crushing machinery. George W. Borton, New Lisbon, N. J., assignor to Pennsylvania Crusher Co. No. 1,948,504.

Method of pulverizing minerals and similar materials. Norwood H. Andrews, Moorestown, N. J., and Walter J. Willoughby, Philadelphia, Pa., assignors to American Pulverizing Corp. No. 1,948,609.

Pulverizing-machine. Edwin E. Elzemeyer and Henry C. Griesedieck, Webster Groves, Mo., assignors to American Pulverizer Co. No. 1,947,700.

Crushing apparatus. Nils D. Levin, Columbus, Ohio, assignor to Jeffrey Mfg. Co. No. 1,947,783.

Crushing apparatus. Walter J. Armstrong, Columbus, Ohio, assignor to Jeffrey Mfg. Co. No. 1,947,784.

Crusher-roll mechanism. Herbert E. Preston, Philadelphia, Pa., assignor to American Engineering Co. No. 1,955,931.

Crusher. Frank E. Christopher, Morgantown, W. Va. No. 1,955,046.

Pulverizing-machine. Paul A. Hirsch, New York, N. Y. No. 1,955,960.

Grinding-mill. Elmer L. Van Pelt, Denver, Colo., assignor to American Ball Mill Co. No. 1,947,505.

Grinding-mill. Arthur W. Fahrenwald, Moscow, Idaho. No. 1,953,472.

Grinding-mill. Walter P. Eppers, Catasauqua, Pa. No. 1,951,823.

Jaw crusher. Paul R. Francis, Los Angeles, Calif. No. 1,954,288.

Rock-crushing plant. John J. MacKay, Minneapolis, Minn., assignor to Diamond Iron Works, Inc., same place. No. 1,950,501.

Drilling

Mounting for rock-drills. John C. Curtis, Cleveland, Ohio, assignor to Cleveland Rock Drill Co. No. 1,952,046.

Rock-drill. Gosta Larsson, Roslags-Nasby, Sweden. No. 1,952,264.

Excavating

Excavating-shovel. Judson Hayward, Hackensack, N. J., assignor to Hayward Co. No. 1,951,909.

Excavating-machine. Leslie P. Green, Chicago, Ill. No. 1,958,269.

FOREIGN

Blasting and Explosives

Detonators. Lignoza Spolka Akcyjna, Katowice, Poland (et al.). British 393,422.

Blasting cartridges. A. C. Scott, Faversham, Kent. British 397,203.

Blasting cartridges. Barbara Akt.-Ges., Vaduz, Liechtenstein. British 398,030.

Detonators. J. T. C. Williams and R. J. Townsend, Arcadia, Pa. British 398,762.

Crushing and Grinding

Crushers. J. B. Roch. French 745,586.

Grinding mills. F. Poitte. French 745,854.

Feed for grinding and drying mills. Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne, England. German 567,957.

Air-swept tube mill. Humboldt-Deutzmotoren Akt.-Ges., Köln-Kalk. German 567,995.

Device for regulating the tension of grinding rolls. "Miag" Mühlenbau- und Industrie Akt.-Ges., Braunschweig. German 566,117.

Air-swept tube or compound mill. Willi Schmidt, Köln-Vingst. German 565,994.

Impact pulverizer and separator. Paul Anger, Kiel. German 510,849, 510,850 and 510,851.

Pulverizing mills. H. S. Pochin and A. Russell. British 393,519.

Grinding-mill delivery attachment. R. A. Lister & Co., Ltd., and W. G. Maw. British 393,731.

Drying

Drying of any granular or like materials. W. L. Paynter and Forth Engine & Motor Works (Newcastle-upon-Tyne), Ltd. British 392,535.

Multiple-chamber dryer. Firma M. Rudolf Jahr, Gera, Reuss. German 569,713.

Dryer with endless conveyor. Nicola K. Pantzireff, Moscow. German 559,880.

Slurry dryer. Arno Andreas, Munster. German 571,115.

Dryer. Montan-und Industrialwerke vorm. Joh. Dav. Starck, Untereichenau. German 573,417.

Rotary dryer. Maschinenfabrik Buckau R. Wolf Akt.-Ges., Magdeburg. German 574,546.

Discharge and screening device for rotary dryer. Zeitzer Eisengiesserei und Maschinenbau Akt.-Ges., Zeitz. German 574,547.

Excavating

Excavators. W. E. Evans (Demag Akt.-Ges.). British 392,565.

Drag scraper system. Orenstein & Koppel Akt.-Ges., Berlin. British 397,383.

Power shovel. Demag Akt.-Ges. French 750,186.

Gypsum

Calcination of gypsum. E. L. Francis (Gypsum Lime & Alabastine, Canada, Ltd.). British 392,780.

Wallboard. Gypsum, Lime & Alabastine, Canada, Ltd., Paris, Ont., assignee of George M. Thompson, Caledonia, Ont. Canadian 332,672.

Material-Handling

Apparatus for conveying slurries, for instance cement raw slurry, with scoops. Fried. Krupp Grusonwerk A.-G. Magdeburg-Buckau. German 570,121.

Method and device for transporting pulverulent material. H. A. Gill (F. L. Smidth & Co., Aktieselskab). British 393,280.

Pneumatic conveyor system. H. A. Gill, London. British 393,280.

Feeding devices for granular material. A. G. Thomas, Leamington, Spa. British 396,565.

Feeding devices for granular materials. T. Hutchinson, Aberdeen, and Scottish Agricultural Industries, Ltd., Leith. British 397,543.

Endless-belt conveyors. Head, Wrightson & Co., Ltd., and others. British 392,921.

Pneumatic conveyors. F. Schicht, Dresden, Germany. British 394,288.

Screening and Separating

Separation of solids of different specific gravities. G. Raw. British 392,578 and 393,970.

Vibratory apparatus for consolidating, separating, etc. Winget, Ltd., and H. Martinez. British 393,002.

Separating materials by jigging. Schuchtermann & Kremerbaum Akt.-Ges. für Aufbereitung, Dortmund, Germany. British 393,004.

Pneumatic separating of solid materials. G. Raw, Ravenswood, Low Fell, County Durham. British 393,981.

Pneumatic separating. C. M. Ure and D. M. Menzies, Glasgow. British 394,062.

Jigging conveyors or separators. W. J. Wallace. British 394,503.

Rotary screens. W. A. Hiscox. British 395,589.

Jig. W. H. Berrisford, Stoke-on-Trent. British 396,807.

Pneumatic separating. General Electric Co., London, and A. Ray. British 396,828.

Vibratory screens. Pegson, Ltd., and C. H. Green, Leicester. British 397,009.

Pit and Quarry will furnish, at its actual cost, a copy of any patent cited herein. A charge of ten cents per copy is made by the U. S. Patent Office, Washington, D. C., and readers may procure a copy directly by addressing the Commissioner of Patents, with payment for copies requested. Postage stamps are not accepted by the Patent Office. We will endeavor to obtain copies of foreign patents for our readers but we cannot give assurance in every case for the reason that copies of such patents are not printed for distribution as liberally as are the American copies, nor is there a fixed charge per copy.

New Machinery and Supplies

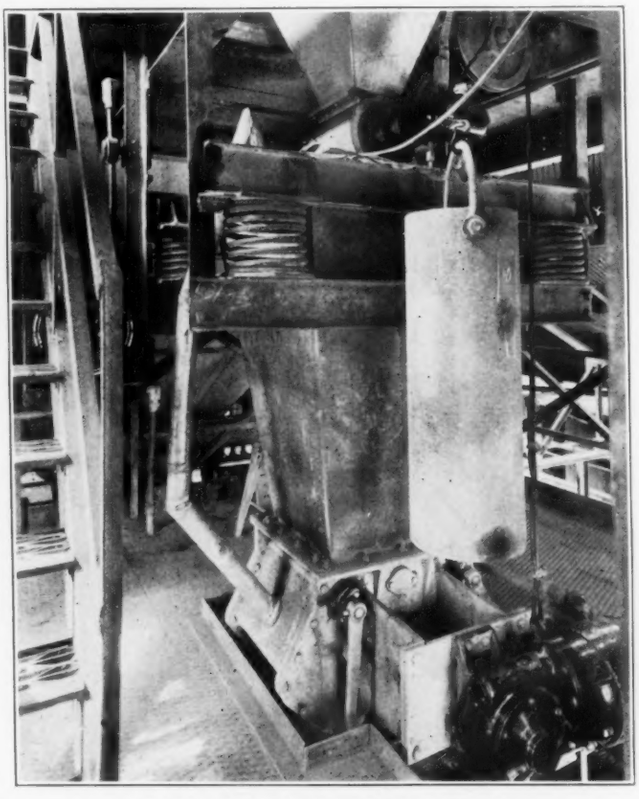
Fuller Announces Weighing Feeder by Dr. Grunewald

The Fuller Company, Catasauqua, Pa., has been granted the exclusive license for the manufacture of a new weighing feeder, by the inventor, Dr. Max E. Grunewald, of the Coplay Cement Manufacturing Co. This new feeder is intended to handle practically all dry pulverized materials, and is of especial interest to the cement industry, as a feeder for both pulverized coal and dry cement raw materials. The first installation is feeding dry cement raw material to a kiln, and is said to have shown amazing accuracy by weight.

Among the features of this new feeder are its ability to feed a uniform stream of predetermined weight continuously, the weight of the stream being variable at will by remote control, as from the burning platform of the kiln. The weight of the stream is thus automatically made adjustable within all normal limits, without adjusting the scale equipment. As the feeder delivers material by weight rather than by volume, materials which vary in weight due to bulking or absorption of air do not impair the accuracy of the apparatus.

The new feeder comprises the combination of a Fuller automatic weighing batcher of the type furnished to contractors and cement mills for weighing Portland cement. This batcher operates automatically, and is discharged at any desired interval, the rate of discharge being subject to remote control, so that the stream ultimately discharged can be varied in weight to suit the will of the operator. The batch is discharged into a scale pan, which carries the reserve supply. A Fuller rotary feeder of the self-cleaning type withdraws a continuous stream from the scale pan. This feeder is driven by a variable-speed motor, so controlled that if the weight of the material withdrawn during any interval of batching varies from the weight of the batch, the weight of the stream is automatically compensated during successive intervals until the weights are exactly uniform. This automatically corrects all variations in the weight of the material per unit of volume due to any cause; and also allows prompt variation to be made in the weight of the stream by remote control merely by changing the rate at which the batcher discharges into the scale pan.

Extremes of weight can be established by changing the scale setting of the batcher, but this is unnecessary in the feeding of raw material, for instance, as the original setting will allow sufficient variation for all purposes to be made. A counter, whereby the actual weight of material for any given period can be established, is provided.



Weighing feeder for dry pulverized materials.

Link-Belt Variable Reducer for Fractional-Horsepowers

The Link-Belt Co., Chicago, Ill., announces the new V. R. D. variable roller drive self-adjusting variable-speed transmission for fractional-horsepower duty as a companion to the P. I. V. gear variable-speed transmission for larger capacities which was brought out five years ago. The new unit is capable of an output of ½ hp. at maximum speed, with a maximum ratio of speed variation of 10 to 1, and continues such features as compact all-metal construction, total inclosure, self-lubrication in an oil bath, protection from moisture and grit, and the use of a positive chain drive.

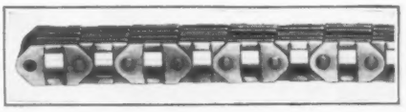
The chain used for transmitting the power from the input to the output shaft is of the side-contact roller type, consisting of steel links, made endless and connected by hardened-steel pins in hardened-steel bushings.

Openings in each pitch of links provide a pocket for each of two hardsteel rollers, and from both sides a portion of roller protrudes sufficiently to allow each pair of chain rollers, at each engagement of the chain and wheels, to roll into contact with the hardened-steel conical opposed disks forming the driving and driven wheels, until finally the chain is engaged positively in the wedge-shaped wheels at the proper pitch line for the speed desired on the output shaft. The disengagement of chain also is a smooth, rolling action.

A speed indicator allows a ready check-up on operating speed settings to be made. Spring pressure applied to the two disks of one wheel serves to maintain correct tension and compensates for natural chain wear automatically.

Gardner-Denver Increases Its Line of Drifter Drills

The Gardner-Denver Co., Quincy, Ill., has announced a new light-weight drifter drill, known as the D-79, which incorporates the "streamline" design, said to have been originated by this company, and a



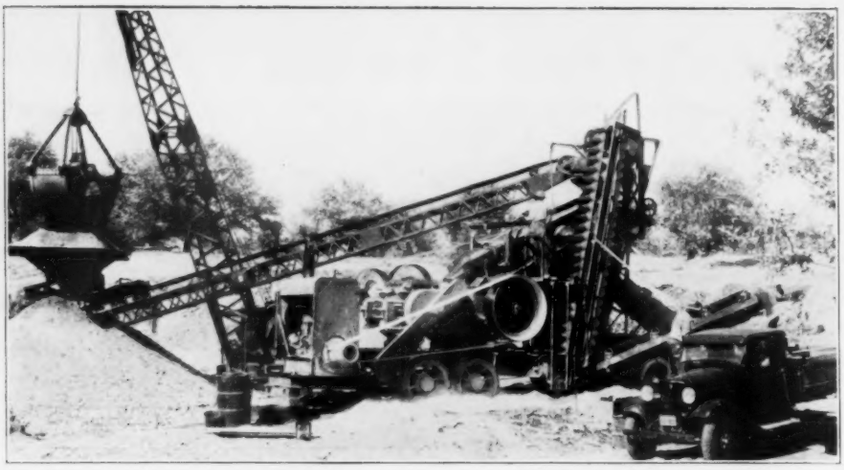
Variable-speed transmission and chain (above).

number of other features which result in high speed, low maintenance cost and ease of operation. This drill weighs 126 lb. and can be equipped with spring handles for use as a sinker.

Among the features are an automatic valve said to give high speed with low air consumption; special long-wearing bronze removable front cylinder liner; direct center exhaust; rugged throttle valve with outboard bearing; and 3-point cross-head support. An integral lubricator supplies lubricant to all parts of the machine, a chamber surrounding the front cylinder bushing being used as a reservoir from which the lubricant is fed to all parts of the drill. This drill is the second of the Gardner-Denver "D" Series drills, of which the recently-announced D-89, described and illustrated in PIT AND QUARRY for June, was the first.

Novel Screen Arrangement in Pioneer Duplex Plant

The Pioneer Gravel Equipment Co., Minneapolis, Minn., manufactures the Pioneer Vibrator Duplex plant for crushing and screening sand and gravel. An interesting feature of this plant is the use of a blank plate between the two screening decks of the vibrating screen to provide two specification screen decks. In operation the pit-run material is fed to the lower deck with the returns from the bucket line coming to the top deck. The material rejected by the top deck is fed to a roll-crusher, the material on the lower deck going to a jaw crusher. The material passing the upper deck is bypassed into the mixing hopper of the plant and, due to the blank plate, need not again pass the lower deck. This system is said to give absolute control from the operator's platform of the balance of the load between the two crushers. If the primary crusher is overloaded on account of the roll-crusher not doing enough work, a ratchet lever on the jaw crusher allows opening the jaws so that part of the excess load can be diverted to the roll-crusher. A plant of this type, recently purchased by the West Michigan Construction Co., Holland, Mich., is producing an average of 45 cu. yd. per hr. based on 30 per cent. pit-run oversize material and is



Portable sand-and-gravel crushing-and-screening plant.

rejecting about 30 per cent. excess fines. This plant is equipped with a swivel-type feed conveyor.

All Pioneer plants are equipped with the sand-rejection feature. Also standard equipment is the SKF roller-bearing crusher. Option is given on the bronze-bearing roll-crushers in four different sizes.

New Abrasion-Resisting Is Cloth Called Buff-Aloy

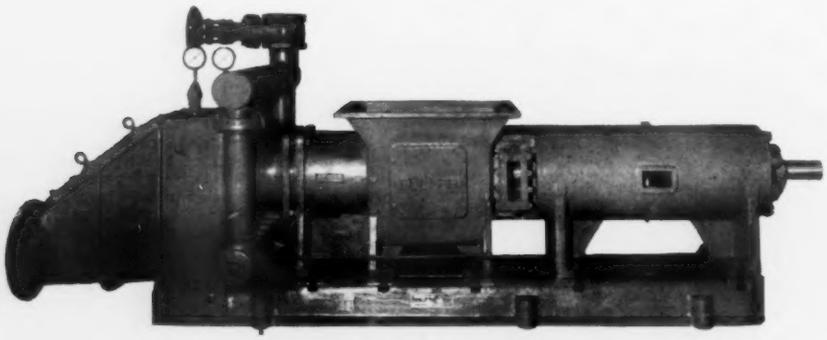
The Buffalo Wire Works Co., Buffalo, N. Y., announces the new Buff-Aloy high-abrasive-resisting wire cloth which is said to be especially adapted for screening abrasive materials or for hard usage. This cloth is made from a special alloy wire developed by engineers in the company's laboratories.

New Fuller Pump Assures Lower Power Consumption

The new Type H Fuller-Kinyon pump, recently announced by the Fuller Co., Catasauqua, Pa., is a development of the Type F, which was placed on the market about two years ago. Among the advantages claimed are considerably decreased power consumption, as compared with all previous types, whereby the total power input to both the driving motor and air-compressor compares favorably with mechanical systems on short distances and offers increasing savings as the conveying distance increases. It was especially designed to use low-pressure air and to operate under stable conditions at all rates of feed. It has been found, accordingly, to be economical in power regardless of irregularity in the rate of material delivered to it.

The theory of operation is precisely the same as that of all Fuller-Kinyon pumps, but a variable mechanical seal, comprising a check or flap valve, has been added. This assists in creating a seal of minimum density under all capacity conditions, whereby the friction load is considerably decreased and the wear on the parts accordingly reduced. The design minimizes any danger from tramp iron or other foreign materials, and this, together with the low material friction is said to have made maintenance a negligible factor.

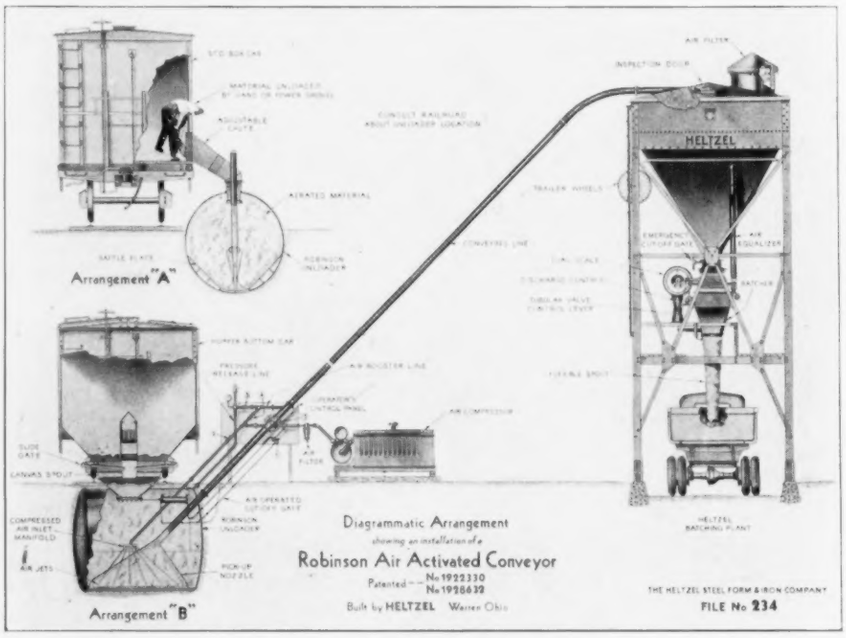
Among the mechanical improvements are changes in the design to allow ready removal of the screw through the front wall of the flap-valve body without disturbing the bearing assembly or any other parts of the pump.



New pump for transporting pulverized materials.

An interesting feature is the novel method of lubrication. The screw shaft is overhung, there being no bearing at the discharge end. The rear end of the shaft is surrounded by a bushing, which is carried by spaced ball-bearings in a unitary bearing support. Adequate dust-sealing devices are provided between the rear wall of the hopper and the inner bearing. These dust seals are of a rotary type and run in oil, the entire seal assembly being removable through a port in the side of the pump. The cylindrical bearing support forms an oil reservoir, in which an oil ring causes a flow of oil through tubing beyond each bearing, whereby the oil flows inwardly through the bearing and back to a sump. Adequate lubrication is provided regardless of the oil level.

A large number of these new pumps are reported by the company to have been placed in service, principally as conveyors of cement and cement raw material. They are capable, however, of handling practically all dry, pulverized materials, and are now in production in a full range of capacities.

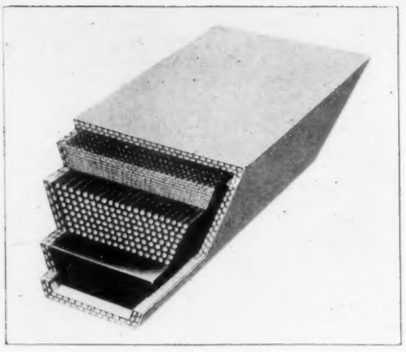


Air-activated system for conveying pulverized materials.

New Pneumatic Conveyor for Pulverized Materials

The Heltzel Steel Form & Iron Co., Warren, O., is manufacturing the Robinson air-activated system for conveying cement and pulverized or granular materials. This device has no moving or wearing parts and is used in connection with any air compressor capable of delivering a small quantity of air at low pressure. It is designed to convey materials hundreds of feet and can be used for unloading cars, trucks or boats and in mills. Installations are said to be in use on large construction work and in central concrete-mixing plants.

The system consists of a pressure tank, complete with cut-off gate and operator's panel, and a conveying pipe-line leading to the receiving receptacle. The pressure tank is located for gravity charging in either of two different arrangements in which the operation is identical. After the material has entered the tank the cut-off valve is closed by air; the air valve is then opened so that the material to be conveyed can be aerated to make it fluent. After sufficient pressure has been built up in the tank the valve on the conveying line is opened and the aerated material starts to flow through the line. Slightly beyond this last valve a small volume of compressed air is continuously admitted to continue the fluent mixture of



V-belt of improved design.

air and material as it is being forced through the conveying line by the advancing material column. At the end of the operating period all of the above valves are closed and another opened to relieve any pressure within the tank before recharging.

Use of Series of Drums Raises Tube-Mill Speed

Dr. Walter P. Eppers, mechanical engineer of Catasauqua, Pa., on March 20, 1934 was granted United States patent No. 1,951,823 on a grinding mill which is said to be an improvement on the tube mills now in use for grinding purposes especially in the cement industry. According to Dr. Eppers the present tube mills can only be operated at a certain favorable low speed to get the most efficient grinding action and this necessitates large mill dimensions.

The new mill consists of a plurality of drums of small size, each on its own axis, with the entire unit rotating about its own axis. The entire unit is built into a frame and the ratio between the drum gears and the gears driving the entire mill kept at a constant ratio. This arrangement replaces the action of gravity in present tube mills with a centrifugal force created by the rotation of the above-mentioned auxiliary centerline. With the proper selection of the gear ratio this new centrifugal force will counteract the centrifugal force created by the rotation of the drum around its own axis. These two forces keep the same proportion regardless of the speed of rotation of the mill.

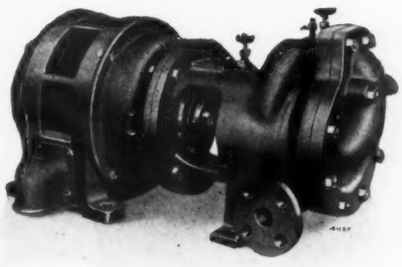
With this design it is said to be possible to speed up a tube mill far above ordinary tube mill speeds and at the same time increase the rubbing pressure between the balls or other grinding medium used. It is said also that such a mill is more efficient and requires less space than ordinary tube mills and can be direct connected to a nigh-speed motor.

Three-Layer Construction Used in Goodrich V-Belt

The B. F. Goodrich Rubber Co., Akron, O., has developed a new V-belt of improved construction. In the design of this belt preservation of balance was of paramount importance. The three layers are balanced to resist stretch and cover wear. These belts are compounded to reduce internal heat to a minimum.

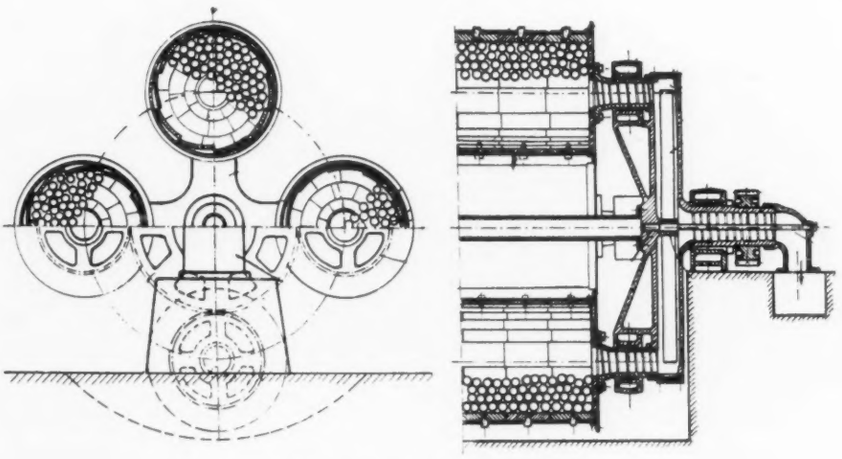
Motorpump Has Motor and Pump Rotor on Same Shaft

The Cameron Motorpump made by the Ingersoll-Rand Co., Phillipsburg, N. J., is now built in 26 sizes ranging from ¼ to 30 hp. and in capacities from 5 to 1,000 gal. per min. Certain sizes are 2-stage units and some other sizes are fitted with self-priming attachments which make them suitable for sump or gathering pumps. Each Motorpump is a complete pumping unit with a built-in electric motor and

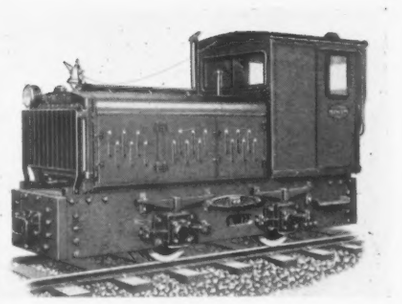


Single-shaft motor and pump.

pump rotor on the same shaft. Wearing rings, shaft sleeve and ball bearings are readily removable. The rotor is of the solid type and is practically indestructible. The impeller is cast in one piece of bronze and is hydraulically balanced. Stationary renewable wearing rings seal impeller hubs against leakage. The stuffing box has needle valve control and ample space and a split gland make repacking easy. Removal of the suction nozzle piece gives complete access to the impeller. Equally-spaced studs on the pump casing permit the discharge to be set in any one of four positions.



Tube-mill using series of drums.



Ten-ton Diesel locomotive.

Diesel 10-Ton Locomotive Brought Out by Plymouth

The Fate-Root-Heath Co., Plymouth, O., builders of Plymouth locomotives, announced a new 10-ton Diesel-powered locomotive. The 6-cyl. power plant is of the solid-injection type with a 4⅞-in. bore and a 6-in. stroke, developing 95 hp. at 1200 r.p.m.

Two types of drives are provided. Locomotives are equipped with mechanical gear drive in sizes from 6 to 60 tons and Diesel-electric drive in sizes from 25 to 60 tons. The patented Plymouth 4-speed transmission incorporated into these latest locomotive developments makes it possible to apply the same power and speed in either forward or reverse movement.

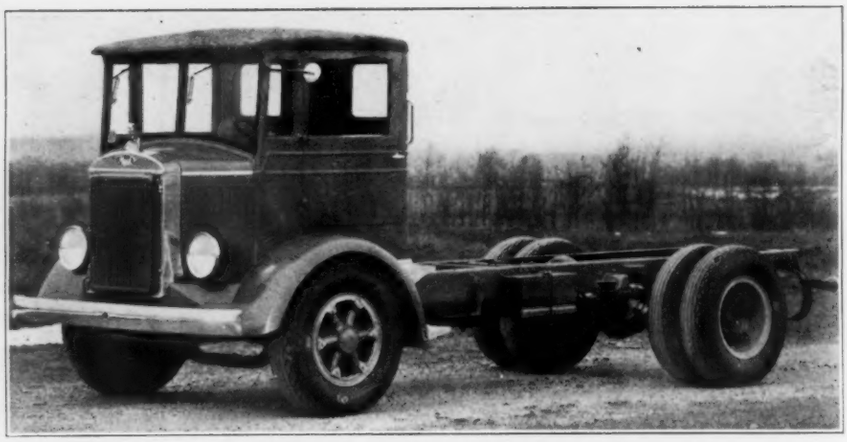
Several decided improvements have been included in the Plymouth chassis. Side and end frames are made from extra-heavy steel to insure perfect alignment. Semi-elliptic springs are both side and cross equalized, insuring easy riding over rough and uneven track, practically eliminating any possibility of derailment. Cabs and canopies are made from heavy-gauge sheet steel and are fully enclosed.

Mack Motor Trucks Have Engines Under the Seats

Mack Trucks, Inc., New York, N. Y., now have in production two new Traffic Type trucks of cab-over-engine design. Due to this construction these new models save 3 feet in length over the corresponding conventional models besides providing one-third front and two-thirds rear distribution of gross weight. Because of this more equitable distribution gross weight within particular axle weight limitations has been increased so that on the same maximum authorized tires the new Model CH, rated at 3 to 5 tons can carry 1,100 lb. more than its conventional counterpart while the new CJ, rated at 3½ to 6 tons, will carry 1,200 lb. more. A reduction of 5 ft. in turning radius has also been obtained by this construction.

Both the new models are powered by 6-cyl. engines, that in the CH having a 4 by 5½-in. bore and stroke and developing 106 hp. at a governed speed of 2,300 r. p. m.; while the 4¼ by 5½-in. CJ engine produces 117 hp. at the same speed. Both engines are of the L-head type with offset turbulence-type combustion chambers and block-cast cylinders of heat-treated, chrome nickel alloy semi-steel with a one-piece detachable head of the same material. Valves are of the flat-seat type with the chrome-silicon exhaust valves seating on alloy valve seat inserts. Case-hardened, drop-forged, generator-ground timing gears and full pressure lubrication are other features. Combustion efficiency is enhanced by a thermostatically-operated heat intake vaporizer and by automatic temperature maintenance through a cold-circulation thermostatic cooling control.

Drive from the dry single-plate clutch is taken through the aluminum-housed 5-speed sliding gear transmission which affords four conventional speeds, direct in fourth with an overgeared fifth. Final drive is of the dual-reduction type, the axle shafts being entirely full floating with



Cab-over-engine truck chassis of 3- to 5-ton capacity.

the entire load being carried by a drop-forged chrome-nickel steel banjo axle. Mechanical foot brakes on all four wheels are actuated by a vacuum booster.

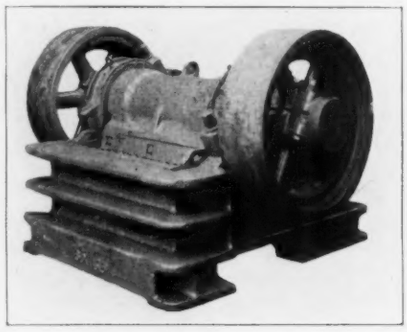
Diesel Crane Has Three-Speed Travel Mechanism

The Industrial Brownhoist Corp., Bay City, Mich., announces the new No. 8 35-40 ton Diesel crane which, it is said, has been designed from the tracks up for Diesel (or gasoline) power. It incorporates many interesting construction features and is said to be extremely quiet in operation. The machine is equipped with a 3-speed travel mechanism so arranged as to have only the travel gears turning when the crane is traveling. This crane is equipped for bucket, hook or pile driver service.

Single-Shaft Jaw Crusher Runs on Roller Bearings

The New England Road Machinery Co., South Boston, Mass., has brought out a new single-shaft roller-bearing jaw crusher which has been undergoing development for the past several years. This crusher has a frame of annealed cast steel reinforced with heavy horizontal and vertical ribs. The swing jaw is also of this steel and has a housing for the heavy-duty cylindrical roller bearings and a replaceable toggle seat. The bearing rollers are of heat-treated alloy steel running in races of similar material. They are held in place by bronze retainer rings and are protected by piston ring seals. The eccentric shaft is of hammered nickel steel accurately ground and polished, and the entire shaft unit can be readily removed by taking off the main bearing caps. The stationary and swing jaw dies are of manganese steel with the backs and edges ground to assure an accurate fit, and are reversible.

When in operation the upper part of the swing jaw moves outward to crush the



Single-shaft jaw crusher.

coarse rock and recedes as the upper stroke terminates. The lower part of the jaw moves forward to finish the crushing action and then recedes to begin a new cycle. The crushing stroke, having the greater movement at the top and diminishing at the bottom, is said to be a very effective action especially in producing more uniform sizes of ¾, 1, and 1½-in. stone. The length of the lower crushing stroke can be changed by moving the toggle in the seat notches. The crusher is lubricated through Alemite fittings. It is made in five sizes from 9-in. by 22-in. to 24-in. by 36-in.

New 35-40-ton Diesel-engine crane.

Traffic (from page 52)

a line of rates on crushed stone [2], representative of which are: To Aliquippa, Pa., $1.00; to Benwood, W. Va., $1.40; to Black Rock, N. Y., $1.30; to Economy, Pa., $1.10; to Lorain, O., $1.10; to Mingo Jct., O., $1.30; and to Wheeling, W. Va., $1.40 per net ton.—Docket No. 40,070.

Western Trunk-Lines Committee

Cement.—Rates on cement from Laramie, Wyo., and Boettcher, Colo., to stations on the U. P. in Nebraska (Central City and west) are based on Scale IV. It is proposed to make these rates based on the average of Scales III and IV, making reductions of from 1 c. to 1½ c.—Docket No. D-11-3.

Southern Freight Assn.

Lime.—It is proposed to publish rates on lime, car-load minimum weight 30,000 lb., to Key West, Fla., for Export, from Calera, Newala, Roberta, and Pelham, Ala., of $4.62 and from Dennie, Ala., of $4.98 per net ton.—Docket No. 5,348.

Southwestern Freight Bureau

Plaster.—Shippers request the establishment of through rates on plaster-board in straight or mixed cars with plaster and related articles from the southwest to the peninsula of Florida by adding the difference between the present plaster-board rates from Memphis to Jacksonville, Fla., and Memphis to the peninsula points to the present plaster-board rates from the southwest to Jacksonville, Fla.—Docket No. 3,384.

Texas-Louisiana Tariff Bureau

Cement, Lime and Plaster.—To meet motor-truck competition carriers propose to establish rates on mixed cars of cement, lime and plaster, car-load minimum weight 24,000 lb., from Lake Charles, La., to Louisiana destinations, Dequincy, 10 c.; DeRidder, 11½ c.; Leesville, 13½ c.; Many, 16 c.; Mansfield, 17 c.; and to Shreveport, 19½ c., per 100 lb.—Docket No. 3,877-LA.

[1] The car-load minimum weight will be 90 per cent. of the marked capacity of car except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

[2] The car-load minimum weight will be the marked capacity of car except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

Ready-Mixed Concrete Directors Hold Meeting

The board of directors of the National Ready-Mixed Concrete Assn. held its annual meeting June 4 at the Palmer House, Chicago, Ill. In the opinion of those present code work should become of secondary importance now that it is past the formative stage and more effort should be devoted to research and promotional work. Closer coöperation with the A. C. I., the P. C. A., and the A. S. T. M. on technical work was also advocated.

One of the first steps will be a campaign to increase association membership to the point where it will be more representative of the industry. As an inducement to join, membership dues have been reduced to $15 per year for producers, regardless of size, and for associate members such as equipment manufacturers.

AMSCO No. 459 WELDING ROD *for Hard-Facing.....*

Industry has learned the value of hard-facing and is rapidly learning the value of using AMSCO No. 459 Hard-Facing Welding Rod for this work.

AMSCO No. 459 Hard-Facing Rod on tests and during five years of field application has proven its superiority by outwearing by 40% other materials costing twice as much. 200% to 300% greater returns on welding rod investment are being made.

Use AMSCO No. 459 Welding Rod on your work. The exclusive characteristics are:

1. Easy to apply with torch—in coated form, with electric arc.
2. Welds with equal facility to manganese or carbon steel and other ferrous metals.
3. Much tougher than other hard-facing materials with comparable abrasion resistance, does not crack, chip or spall off.
4. Being iron base, it fuses readily with iron or steel parts and is better adapted to the work than hard-facing containing no iron.
5. Its qualities of adhesion and toughness are not lessened by heat treating.
6. Presents outstanding resistance to wear and abrasion, even under impact.
7. Costs much less than comparable materials.

Try AMSCO No. 459 Hard-Facing Rod on your next job. Pug Mill Knives, Plow Shares, Dipper Teeth, Drag Chains, Crusher Parts, Tractor and Road Machinery Parts, Screw Conveyors, Pusher Shoes and hundreds of other machine and equipment parts are readily salvaged by hard surfacing with AMSCO No. 459 Welding Rod.

[If you have never used it—send for FREE SAMPLE. Use the coupon below]

American Manganese Steel Company

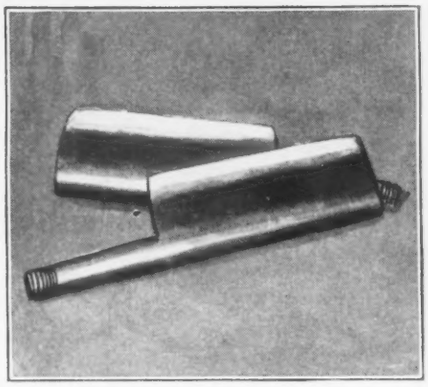
387 East 14th Street Chicago Heights, Ill.

Sales Offices and Distributors in Principal Cities

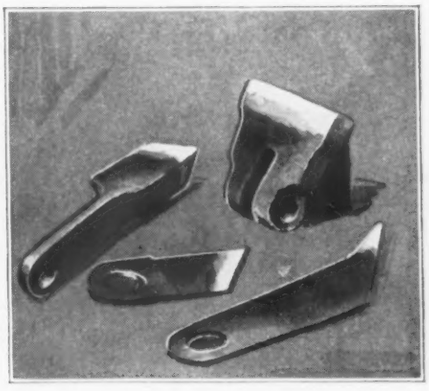
AMSCO

TRADE MARK REGISTERED

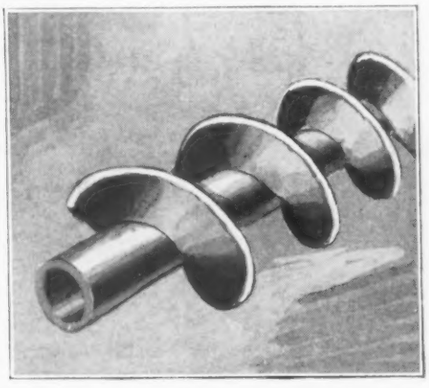
American Manganese Steel Co.,
387 East 14th Street,
Chicago Heights, Illinois.
Gentlemen:
Please send us free samples of AMSCO Welding Rods as indicated below:
—AMSCO Nickel Manganese Steel Rod. Size.....
—AMSCO #459 Hard Surfacing Rod. Size.....
—AMSCO Welding Rod Bulletin.
To be used for.....
.....
Current characteristics.....
Name.....
Company.....
Address.....



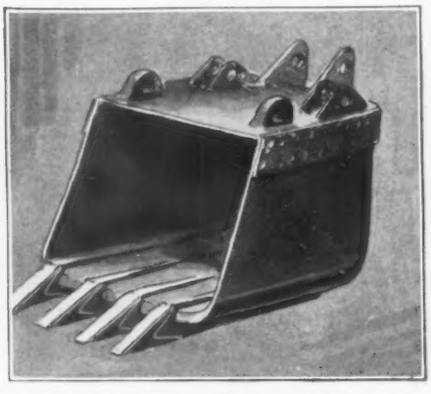
Pug Mill Knives have a vastly extended life when hard-faced with AMSCO No. 459 Rod.



AMSCO No. 459 Welding Rod is ideally applied to pulverizer hammers of every type.



Screw Conveyor Edges, hard-faced with AMSCO No. 459 Welding Rod, many times return their cost.



Hard-faced with AMSCO No. 459 Welding Rod, Dipper Teeth last many times longer.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

Index to Advertisers on Page 72

Agitators, Thickeners and Slurry Mixers
Manitowoc Engr. Works
*Smidth, F. L., & Co.

Agitating Ladders (Dredge)
*Eagle Iron Works

Air Compressors (Portable)
Fuller Co.
*Ingersoll-Rand Co.

Air Compressors (Stationary)
Fuller Co.
*Ingersoll-Rand Co.

Air Pumps
Fuller Co.
*Ingersoll-Rand Co.

Air Separators
Gay, Rubert M.
*Gruendler Crusher & Pulv. Co.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Alloys (Steel)
Manganese Steel Forge Co.

Ash and Refuse-Handling Equipment
Allen-Sherman-Hoff Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Automatic Feeders
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Automatic Weighers
*Bartlett & Snow Co., C. O.

Balls (Grinding)
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Manganese Steel Forge Co.

Balls (Tube-Mill, etc.)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Manganese Steel Forge Co.
*Smidth, F. L., & Co.

Barges (Steel)
Manitowoc Engr. Works

Baskets (Dipping)
Buffalo Wire Works Co.

Bearings (Anti-Friction)
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Link-Belt Co.
Sprout, Waldron & Co.

Bearings (Oil-Less)
Chrysler Corp.; Amplex Division

Belting
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Sprout, Waldron & Co.

Belting (Multiple V)
Goodyear Tire & Rubber Co.

Bin Gates
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Fuller Co.
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.

Bins (Cast Iron)
Allen-Sherman-Hoff Co.

Bins (Steel)
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.
Sprout, Waldron & Co.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
Atlas Powder Co.

Blasting Supplies
Atlas Powder Co.
*Ensign-Bickford Co.

Blocks (Sheave)
American Manganese Steel Co.
Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
Sprout, Waldron & Co.

Bodies (Motor Truck, Concrete Mixing)
*Bartlett & Snow Co., C. O.

Borings, Core
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Bronze Work (Ornamental)
Buffalo Wire Works Co.
National Wire Cloth Co.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Clamshell, Orange-Peel, Etc.)
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Buckets (Dragline—Cableway)
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
*Sauerman Bros., Inc.

Buckets (Elevator and Conveyor)
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.

Bulk-Cement Storage Plants
Sprout, Waldron & Co.

Cableways
*American Steel & Wire Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Caps (Blasting)
Atlas Powder Co.

Capstans (See Winches and Capstans)

Car Dumpers
*Link-Belt Co.

Car Pullers
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Carriers
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Car Wheels — (See Wheels — Car)

Castings
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
*Link-Belt Co.
McLanahan and Stone Corp.
Sprout, Waldron & Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete-Mixing Plants (Complete)
*Bartlett & Snow Co., C. O.
Sprout, Waldron & Co.

Chain (Dredge and Steam Shovel)
Manganese Steel Forge Co.

Chain Drives
*Link-Belt Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Chutes and Chute Liners
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
*Smidth, F. L., & Co.
Sprout, Waldron & Co.

Classifiers
Deister Machine Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.

Clips (Wire Rope)
*American Steel & Wire Co.

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Gay, Rubert M.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.
*Smidth, F. L., & Co.
Universal Road Machy. Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Breakers (Air)
*Ingersoll-Rand Co.

Condensers
*Ingersoll-Rand Co.

Cones (Sand-Washing)
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Conveyors and Elevators
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Fuller Co.
*Gruendler Crusher & Pulv. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.
*Universal Crusher Co.
Universal Road Machy. Co.

Conveyors (Ready-Mixed Concrete)
*Bartlett & Snow. Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Coolers (See Kilns and Coolers —Rotary)

Correcting Basins
*Smidth, F. L., & Co.

Couplings (Flexible and Shaft)
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Couplings (Hose, Pipe, etc.)
*Ingersoll-Rand Co.

Cranes (Crawler and Locomotive)
*Link-Belt Co.
Manitowoc Engr. Works
*Michigan Power Shovel Co.
Ohio Power Shovel Co.

Crusher Parts
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
McLanahan and Stone Corp.

Crushers (Hammer)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Dixie Machy. Mfg. Co.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Universal Crusher Co.

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulv. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Foundry & Machinery Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works
*Universal Crusher Co.
Universal Road Machy. Co.

Crushers (Ring)
*Bartlett & Snow Co., C. O.

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.

Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.

Detonators
Atlas Powder Co.

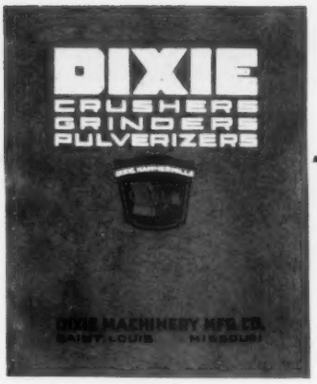
Diesel Engines (See Engines—Diesel)

Dippers and Teeth (Power Shovel)
American Manganese Steel Co.

Dragline Cableway Excavators
Good Roads Machy. Corp.
*Link-Belt Co.
*Sauerman Bros., Inc.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

Write for your copy of this new catalog.



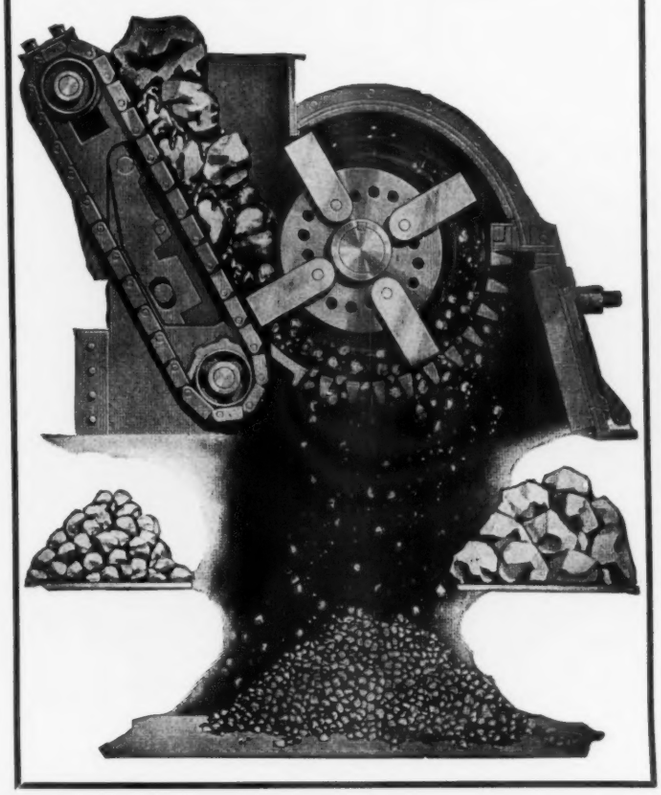
Tells you the modern methods of reduction.

first get the facts

Before you decide on crushing equipment, check the performance records of the DIXIE MOGUL Non-Clog Hammer Mill. They will open your eyes to the advantages of Dixie construction which insures maximum strength and stamina in every working part. The special moving breaker plate gives 26 times the average wearing area. Consider the greatly increased service life that this and many other exclusive features assure in the DIXIE MOGUL Hammer Mill.

And you can have the Dixie Crusher in any one of 40 sizes—a full range of capacities for primary, secondary or fine reduction. No matter how tough the crushing job, you can do it better with a DIXIE.

DIXIE
MACHINERY MFG. CO.
4209 GOODFELLOW AVE., ST. LOUIS, MO.



New!

More Capacity!

Lower Costs!

Positive Uniformity!

Greater Efficiency!

The capacity of grinding mills is materially increased by this new Gayco Centrifugal Air Separator. Fines are removed as they are made.

It delivers an absolutely uniform product of any fineness desired from 60 to 400 mesh with greater capacity and lower power cost than is possible with any other type of air separator.

It is slow speed, requiring very little power. Repair costs are practically nothing—the only wearing parts are the steel cut gears and bearings enclosed in a dust proof casing.

Send for further details—

RUBERT M. GAY
Division, Universal Road Machinery Company

114 Liberty St. **New York, N. Y.**

Crushing, Screening, Washing

equipment—Reliance—in capacities from 50 to 1500 tons per day. Built with simplicity of design for long hard service with low maintenance costs. Send for catalog and full information.

Universal Road Machinery Co.
Kingston, N. Y.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 72

Dragline Excavators
*Link-Belt Co.
Manitowoc Engr. Works
*Michigan Power Shovel Co.
Ohio Power Shovel Co.
*Sauerman Bros., Inc.

Dredges
Hetherington & Berner, Inc.
*Morris Machine Works

Drilling Contractors
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Core)
*Ingersoll-Rand Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills, Diamond
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Rock)
*Ingersoll-Rand Co.
*Jeffrey Mfg. Co.

Drill Sharpening Machines
*Ingersoll-Rand Co.

Drill Steel
*Ingersoll-Rand Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.

Dust-Collecting Systems
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Raymond Bros. Impact Pulv. Co.

Dust Conveying Systems
Fuller Co.

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Dust Hoods and Helmets
Pulmosan Safety Equipment Corp.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Engineers
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Fuller Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Smidth, F. L., & Co.
Sprout, Waldron & Co.

Engine Generator Sets
See Generator Sets (Engine).

Engines (Diesel)
*Ingersoll-Rand Co.

Engines (Steam)
*Ingersoll-Rand Co.
*Morris Machine Works

Excavating Machinery (See Shovels; Cranes; Buckets; etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.

Fans (Exhaust)
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Fuller Co.
Good Roads Machy. Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Morrow Mfg. Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.

Fencing (Woven Wire)
*American Steel & Wire Co.
Buffalo Wire Works Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.

Gaskets
Goodyear Tire & Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gears and Pinions
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Goggles
Pulmosan Safety Equipment Corp.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grating (Steel)
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

Grizzlies
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Good Roads Machy. Corp.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
Smith Engr. Works
Universal Road Machy. Co.

Guards (Wire)
*Bartlett & Snow Co., C. O.
Manganese Steel Forge Co.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.

Hammer Mills (See Crushers—Hammer)

Hoists
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.
*Sauerman Bros., Inc.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co.
*Ingersoll-Rand Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
*Smidth, F. L., & Co.

Kominuters
*Smidth, F. L., & Co.

Lime-Handling Equipment
*Bartlett & Snow Co., C. O.
Fuller Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Bartlett & Snow Co., C. O.
Fuller Co.
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Locomotives (Electric, Gas and Steam)
*Lima Locomotive Works

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Manganese Steel Forge Co.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Manganese Steel Forge Co.

Mill Liners and Linings
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth, F. L., & Co.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Fdy. & Mch. Co.
Raymond Bros. Impact Pulv. Co.
*Smidth, F. L., & Co.
Sprout, Waldron & Co.

Motor Trucks
General Motors Truck Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
Buffalo Wire Works Co.

Nozzles (Gravel Washing)
Binks Mfg. Co.
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
Binks Mfg. Co.
*Deister Concentrator Co.

Packings
Goodyear Tire and Rubber Co.

Partitions (Wire)
Buffalo Wire Works Co.
National Wire Cloth Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
Morrow Mfg. Co.
Sprout, Waldron & Co.

Pipe Flanges
Hetherington & Berner, Inc.

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Fuller Co.
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Portable Crushing and Screening Plants
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
Pioneer Gravel Equip. Mfg. Co.
*Universal Crusher Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Bartlett & Snow Co., C. O.
Gay, Rubert M.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Pulverizers (See also Crushers; Mills; etc.)
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Foundry & Machinery Co.
Raymond Bros. Impact Pulv. Co.
*Smidth, F. L., & Co.
*Universal Crusher Co.

Pump Valves (See Valves Pump)

Pumps (Air Lift)
Fuller Co.
*Ingersoll-Rand Co.

Pumps (Bulk Cement)
Fuller Co.

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works
*Smidth, F. L., & Co.

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Morris Machine Works

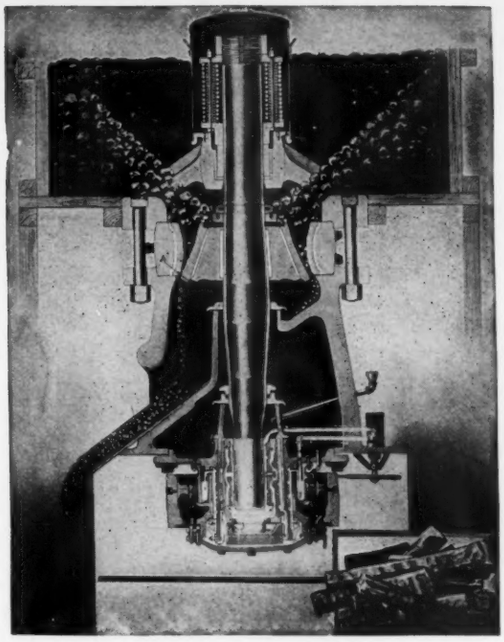
Pumps (Dredging)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Morris Machine Works

Pumps (Vacuum)
Fuller Co.

Ready-Mixed Concrete Plants
*Bartlett & Snow Co., C. O.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**



Greater tonnage with half the power cost

Guaranteed!

The Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to produce a greater tonnage than any other crusher of a given size, with half the power per ton of ore. This crusher can be equipped with a synchronous motor in its pulley, or driven by belt from a standard motor.

The Savings Effected with this crusher are astounding:

In cost of Maintenance.....80%
In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to ⅛ in., and using less than 15 hp., follows:

Minus ⅜ in	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
Minus 48—Plus 100	4%
Minus 100	5½%

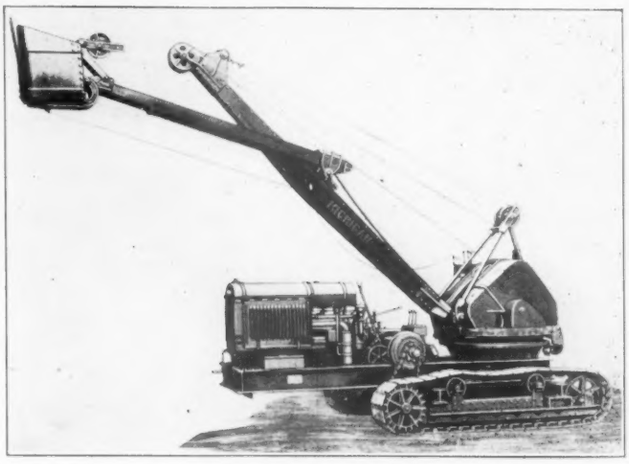
Write today for our Catalog No. 16-P-734

KENNEDY-VAN SAUN MFG. & ENG. CORP.

2 Park Avenue **New York, N. Y.**

BRANCH OFFICES:—Chicago; 120 South La Salle St. Birmingham, Ala.; Comer Building. Los Angeles, Calif.; 416 South Spring St. London, England; Bush House. Paris, France; 40 Rue des Mathurins. Johannesburg, S. Africa; 73 Cullinan Bldg. Canadian Agents; The William Kennedy & Sons, Ltd., Owen Sound, Ont. Australian Agents; Walkers Limited, Maryborough, Queensland. New Zealand Agents; Booth, MacDonald & Co., Ltd., Christchurch.

Make every minute count! with the MICHIGAN CRAWLER



Michigan full-revolving convertible crawler shovel with standard ⅜ cu. yd. dipper

On rush jobs—in close quarters—over rough ground—that is where the Michigan Power Shovel shows at its best, crashing through to new high records in yardage.

Finger-tip control puts the operator in complete command of the Michigan Shovel for easy maneuvering and fast working. *Full circle loading* gives a clean sweep over the job for working up close or out wide. *Three-quarter digging* is made possible with the power plant remaining stationary. *No tail swing* is a time-saving feature that adds to the operating efficiency of the Michigan.

By simply switching booms, the Michigan is convertible into a crane or dragline outfit. It is adaptable to any or all jobs, digging, dumping, loading, hoisting or clam-shell work. With plenty of power and stamina, this compact unit is often able to "work circles" around bigger shovels, because it makes every minute count.

Write for Bulletin of the Michigan Power Shovel (Crawler Type)

FULL CIRCLE LOADING — THREE QUARTER DIGGING — NO TAIL SWING

Also ask for details of the Michigan Truck Shovel

MICHIGAN POWER SHOVEL CO.

BENTON HARBOR, MICHIGAN

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 72

Recuperators
Catlin, A. W.
Manitowoc Engr. Works

Respirators
Pulmosan Safety Equipment Corp.

Rock Drills (See Drills—Rock)

Rod Mills
*Kennedy-Van Saun Mfg. and Eng. Corp.

Rope (Wire) (See Wire Rope)

Safety Equipment
Pulmosan Safety Equipment Corp.

Sand Separators
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works

Sand-Settling Tanks
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works

Scrapers (Power Drag)
Iowa Mfg. Co.
*Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
*Sauerman Bros., Inc.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
Chicago Perforating Co.
*Deister Concentrator Co.
Deister Machine Co.
*Eagle Iron Works
Gay, Rubert M.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulv. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Manganese Steel Forge Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Pioneer Gravel Equip. Mfg. Co.
Productive Equip. Corp.
Smith Engr. Works
Sprout, Waldron & Co.
*Universal Crusher Co.
Universal Road Machy. Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
*Deister Concentrator Co.
Deister Machine Co.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulv. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.
Productive Equip. Corp.
Smith Engr. Works
Sprout, Waldron & Co.
*Universal Crusher Co.

Separators (Air) (See Air Separators)

Separators (Slurry)
*Smidth, F. L., & Co.

Sheaves
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
*Gruendler Crusher & Pulv. Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Sprout, Waldron & Co.

Shovels (Electric, Internal Combustion and Steam)
*Link-Belt Co.
Manitowoc Engr. Works
*Michigan Power Shovel Co.
Ohio Power Shovel Co.

Silos
*Smidth, F. L., & Co.

Skip Hoists and Skips
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Speed Reduction Units
Iowa Mfg. Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
Binks Mfg. Co.
*Deister Concentrator Co.

Sprays (Paint)
Binks Mfg. Co.

Sprockets and Chain
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Stackers
*Jeffrey Mfg. Co.

Steel (Alloy)
Manganese Steel Forge Co.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Storage Equipment
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Sweeping Systems
Allen-Sherman-Hoff Co.

Tanks
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works

Tires (Truck)
Goodyear Tire & Rubber Co.

Tools (Drill) (See Drilling Accessories)

Tractors
*Allis-Chalmers Mfg. Co.

Trailers
General Motors Truck Co.

Tramways (Aerial)
*American Steel & Wire Co.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Trippers
*Bartlett & Snow Co., C. O.
Good Roads Machy. Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
*Bartlett & Snow Co., C. O.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Underground Loaders
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Unloaders (Box Car)
*Bartlett & Snow Co., C. O.
Fuller Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens—Vibrating)

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equip. Mfg. Co.
*Smidth, F. L., & Co.
Smith Engr. Works
Universal Road Machy. Co.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
Manganese Steel Forge Co.

Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
*Eagle Iron Works
Iowa Mfg. Co.

Winches and Capstans
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Wire & Cable (Electric)
*American Steel & Wire Co.

Wire Cloth
Buffalo Wire Works Co.
Manganese Steel Forge Co.
National Wire Cloth Co.

Wire Rope
*American Steel & Wire Co.
Buffalo Wire Works Co.
Williamsport Wire Rope Co.

Wire-Rope Fittings
*American Steel & Wire Co.
Buffalo Wire Works Co.
Williamsport Wire Rope Co.

Wire Rope Slings
*American Steel & Wire Co.
Williamsport Wire Rope Co.

Wire (Welding)
American Manganese Steel Co.
*American Steel & Wire Co.
Manganese Steel Forge Co.

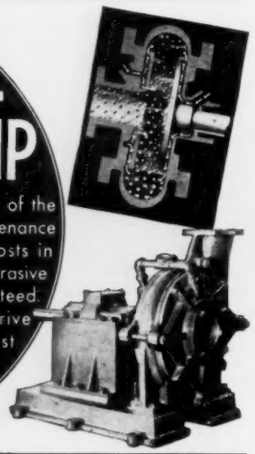
Worm Gears (See Gears and Pinions)

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

HYDROSEAL DREDGE PUMP

Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.

ALLEN-SHERMAN-HOFF CO.
223 South Fifteenth Street
Philadelphia, Pa.



Low Cost Machines for Long Range Work

SLACKLINE CABLEWAYS — the world's best for digging from rivers or wet pits.

CRESCENT SCRAPERS—supreme for working bank deposits, for stripping or storing.

SAUERMAN BROS., Inc.
434 S. Clinton St. CHICAGO

Operated by One Man.
10 to 600 cu. yds. per hour.

WRITE FOR CATALOG.

HENDRICK
PERFORATED METALS

are popular in the quarry fields. They wear well. Full range of sizes

Heat-Treated
Double-Corrugated Plates

with square, round and "Sqround" perforations. Write for data, particularly on the new "Sqround" Mesh.

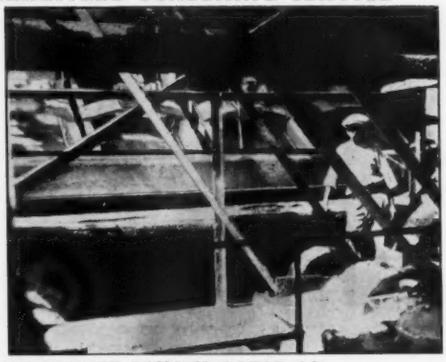
Investigate the Weston Testing Screen for making sizing tests.

HENDRICK MANUFACTURING CO. Carbondale, Pa.

Baltimore Birmingham Boston Cincinnati Cleveland
Detroit Hazleton New York Philadelphia Pittsburgh

GUARANTEED SCREENING SERVICE

LEAHY



THE DEISTER CONCENTRATOR CO.
911 Glasgow Ave. Incorporated 1906 Ft. Wayne, Ind.
New York Office, 104 Pearl St., New York

LEADERS SINCE 1835

CRUSHERS—Double roll and Sledge Wedge Crushers, for practically any product. Capacities to 1000 tons an hour.

SUPER DRY PANS—For especially large tonnages.

WASHERS AND SCRUBBERS—Steel log Washers; scrubbers, cylinder washers, sand drags and washing screens.

DRYERS—Revolving cylindrical, of various sizes.

JIGS—For concentrating and beneficiating hematite and manganese ores.

SCREENS—Cylindrical and conical screens of any size and capacity.

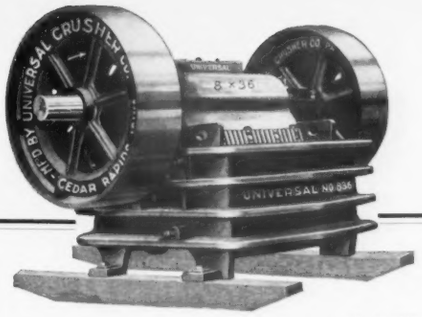
HOISTS, ELEVATORS AND CONVEYORS—Electric, friction and gravity hoists, steel conveyors of different sizes and capacities.

McLanahan & Stone Corp.
Hollidaysburg, Pa.

EAGLE
EQUIPMENT

Spiral Screw and Log Washers, De-Waterers and Shale Removers, Flume Classifiers, Swintek Ladder Suction Screen Nozzles, Chain Type Cutters, Barges and Pontoons, A Frame and Gantry Hardware, Vibrating and Revolving Screens, Steel Dump Cars, Grizzlies, Car Wheels and Trucks, Steel Bins, Water Tanks, Structural Towers, and Dry Pans.

EAGLE IRON WORKS
Machinists — Founders
DES MOINES, IOWA



Style GR
UNIVERSAL STEEL
CRUSHER
Fine aggregates in
one operation

"Big Shot" Crushers

—that is what the field men call them. They are UNIVERSAL Crushers to you—tough enough to "take it" and fast enough to "make good" on the biggest rush job.

Stationary or portable, they meet every requirement in today's stiff specifications for a uniform grade of material at low cost. Reducing aggregates to size in one operation—as UNIVERSALS do—is the cheapest and quickest method.

UNIVERSAL Portable Units for crushing, screening and loading, are winning wide popularity these days. They are setting new records in quick movement from job to job and in keeping ahead of production schedules under the hardest conditions.

Write for Catalog and select the crusher or unit plant you need for your new projects.

UNIVERSAL
CRUSHER COMPANY
619-C Avenue West, Cedar Rapids, Iowa

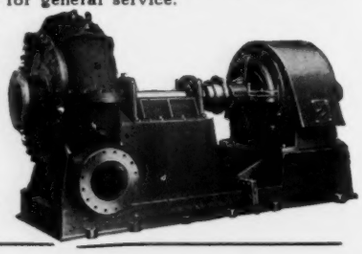
Typical UNIVERSAL Unit Plant in action.
Always easy to move and ready to go.

NRA MEMBER U.S. WE DO OUR PART

MORRIS
CENTRIFUGAL PUMPS

For hydraulic dredging, filling, sand and gravel production; hydraulic conveying of slurry and other liquids containing abrasive materials; clear water pumps for general service.

Also complete dredges with all accessory equipment. Dredging pump designs include heavy-duty types and special alloy parts for severe service. Types and sizes for the largest or smallest operations, and for belt, motor, steam, oil or gasoline-engine drive.



Write for Bulletins

Morris Machine Works

Baldwinsville, N. Y.

Export Office: 30 Church St., New York.

Lewistown Foundry Products

ARE

Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

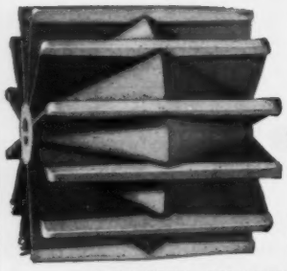
Lewistown Foundry & Machine Co.

Lewistown, Pa.

SAVE YOUR CONVEYOR

and

Elevator Belts *with* SPROUT-WALDRON Wing Pulleys



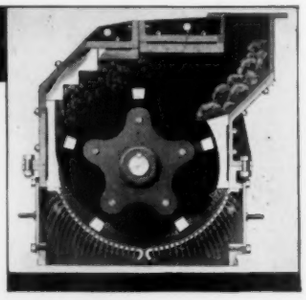
Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

SPROUT, WALDRON & CO. INC.

1221 SHERMAN ST., MUNCY, PA.

Elevating, Conveying and Transmission Equipment

Crushers

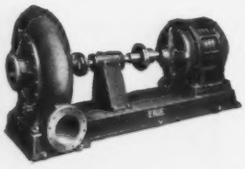


- Cyclo Crusher Pulverizers are inexpensive. They are equipped with Timken Bearings, manganese steel hammers, fly wheel, cast steel breaker blocks and are completely lined with hard iron wearing plates. Capacities 1 to 25 tons per hour when crushing to 10 mesh or finer.

- ROTARY SCREENS
- DRYERS
- SKIP HOISTS
- ELEVATORS
- BELT CONVEYOR IDLERS
- CONVEYORS

THE C. O. BARTLETT & SNOW CO.

6197 HARVARD AVENUE · CLEVELAND, OHIO



Lower Your Pumping Costs with ERIE PUMPS

This is being done daily in sand and gravel plants where ERIE PUMPS are used. An ERIE will help you in the same way.

Our catalogue explains fully the superior features of ERIE design and construction. Write for your copy today, also briefly outlining your pumping conditions and we will gladly make you recommendations and quote you prices.

ERIE PUMP & ENGINE WORKS

153 Glenwood Ave. Medina, N. Y.

Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

MATERIAL IN STOCK
PROMPT SHIPMENT

CHICAGO PERFORATING CO.

2435 West 24th Place

Tel. Canal 1459 CHICAGO, ILL.

Advertise your wants and surplus equipment in

Pit and Quarry

with which is consolidated

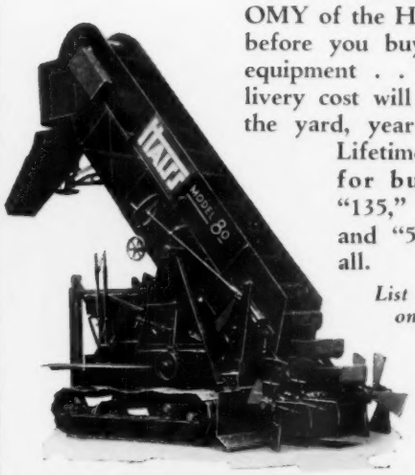
CEMENT-MILL & QUARRY

HAISS

LOADER USERS SAVE MONEY:

Whether you pick the 5-yd.-a-min. "135," the big "80," the "27" or the "50" depends on how much you handle. But measure the EXTRA WORK ABILITY and OPERATING ECONOMY of the Haiss Loaders before you buy any yard equipment . . . Your delivery cost will be less, by the yard, year or Loader Lifetime . . . Write for bulletins on "135," "80," "27" and "50"—one, or all.

List of owners on request



GEORGE HAISS MANUFACTURING CO., Inc.
142nd Street & Rider Ave. NEW YORK, N. Y.

Acclaimed by ALL INDUSTRY!

The New **PULMOSAN DUST RESPIRATOR** *"M Type"*

"Finest respirators we've seen" . . . "men highly satisfied" . . . "expect to go 100% Pulmosan" . . . "a fine piece of workmanship"—these are the comments greeting the new "M" type Pulmosan Dust Respirators in every branch of industry.

Plants that have made comparisons, find the "M" type respirator by far the most effective, comfortable, natural-breathing device for protecting workers against the danger of lead, silica, other dangerous dusts, and paint or enamel spray mists.

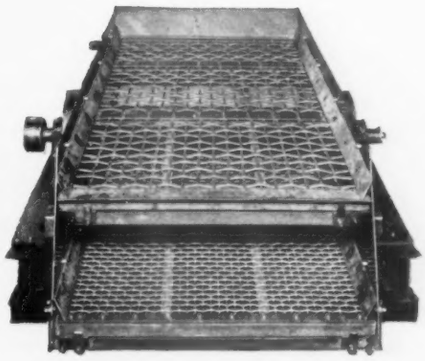
Let YOUR workers judge an "M" type. We are confident they will want no other. Write for descriptive bulletin No. 2, covering six "M" models.

NRA MEMBER U.S. WE DO OUR PART

PULMOSAN SAFETY EQUIPMENT CORP.
176 Johnson St., Brooklyn, N. Y.

BUFF-ALOY

High Abrasive Resisting Wire Cloth



"Mechanical Screen with 'BUFF-ALOY' Wire Cloth installed complete"

A brand new screen development, especially adapted for screening abrasive materials or particularly hard usage.

For years we have been experimenting and developing "BUFF-ALOY" during which time — "BUFFALO" ROK-TEX Wire Screens have been giving greater results than other wire screens on the market for this purpose.

Now we present a further development in a Wire Screen which we have christened "BUFF-ALOY" and which is as great an improvement over "ROK-TEX" as "ROK-TEX" was over ordinary Steel Wire Cloth.

"BUFF-ALOY" is made from a special alloy wire developed in our own laboratories, by our engineers, with the object in view of cutting down replacement costs —and giving the consumer a perfectly developed "ABRASIVE RESISTING SCREEN."

For your next requirements give "BUFF-ALOY" a trial. You will come back again for more.

Full information and prices furnished upon application with sizes and specifications of your requirements.

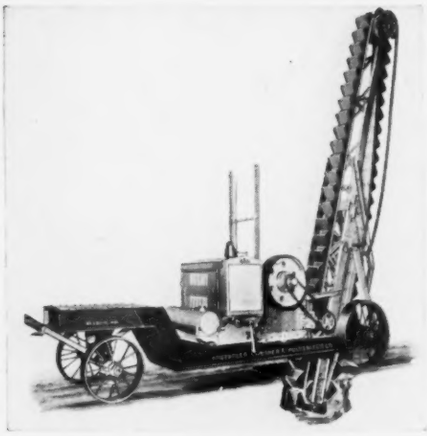
Write for "BUFF-ALOY" Folder No. 101-B.

NRA MEMBER U.S. WE DO OUR PART

BUFFALO WIRE WORKS COMPANY
(formerly Scheeler's Sons)
Established 1869
526 Terrace Buffalo, New York
Branch Office and Warehouse
11 South Seventh St.—Phila., Penna.

BUFF-ALOY

the famous Forty-Niner



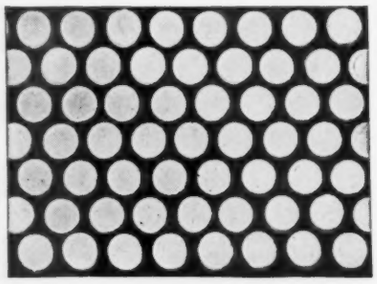
leads the way in '34

Climaxing a long line of improvements, Gruendler now offers to the road builders of today the latest type of portable crushing unit—the famous FORTY-NINER. This modern outfit, including a truck-mounted crusher and elevator, sets a new standard in crushing machinery. It represents the sum total of Gruendler experience and progress since 1885.

Write for the new Bulletin which gives complete details of the Gruendler Forty-Niner.

GRUENDLER
CRUSHER & PULVERIZER CO.
2915 North Market St., Dept. PQ.
ST. LOUIS, MO.

MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

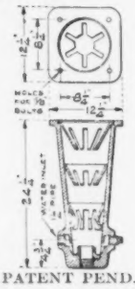
The Morrow Manufacturing Co.
Wellston, Ohio

ATTENTION
Sand and Gravel Men,

Here Is Something New

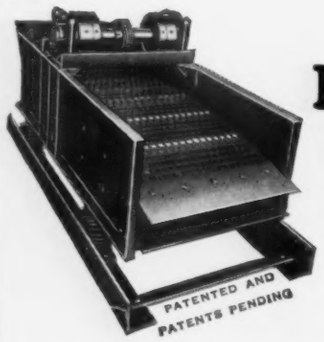
DEISTER COMPOUND FUNNEL CLASSIFIER

For the hydraulic sizing of your finer materials—5/16" and down. Also for cleaning your sand by elimination of silt, slime, vegetable matter and other light impurities.



PATENT PEND.

Write for Bulletin No. 23 just off the press



Improved

PLAT-O VIBRATING SCREEN

Fully described in Bulletin No. 22 just off the press.

Write for it.

DEISTER MACHINE COMPANY
1933 EAST WAYNE STREET FT. WAYNE, IND.

The Field's Best Paper Is Now Only One Dollar per Year—Why Pay More?

Since the announcement of the reduction in price of Pit and Quarry, more subscriptions have been received from operators in a single month than in previous three months' periods.

For now monthly operators get all the news of the industry, intelligent and comprehensive discussions of its problems, more and better plant stories and technical articles, and all departments formerly presented—all for one dollar per year.

Pit and Quarry is read by 2½ times as many production, administrative, and sales executives who subscribe to trade papers as any other paper in the field. Showing that subscriber-popularity is proof of editorial superiority.

Try a year's subscription—you'll find ideas in each issue that will more than repay the whole subscription price.

PIT AND QUARRY PUBLICATIONS
538 S. Clark Street Chicago, Ill.

GREGORY HI-GRADE-REBUILT

We
- Sell
- Buy
- Rent
- Repair
- Exchange
- All Makes
- and Sizes

MOTORS
GENERATORS
TRANSFORMERS
METERS, PUMPS
HOISTS, etc.

Always Dependable
Economical

Money-Back Guarantee

GREGORY ELEC. CO.
1603 S. Lincoln St., Chicago

CONSOLIDATED

GOOD USED CRUSHING, QUARRY and CONTRACTOR'S EQUIPMENT FOR SALE

SEND US YOUR INQUIRIES FOR

Complete Crushing Plants; Diesel, Gasoline, Electric Cranes and Shovels; Hoists; Compressors; Pumps; Dragline and Excavating Equipment; and all sizes and types of Jaw, Gyratory and Roll Crushers; Swing Hammer Mills; Elevators; Belt Conveyors; Rotary and Vibrating Screens; Rotary Kilns and Dryers; Raymond and other fine Pulverizers; Air Separators; Hardinge Ball and Pebble Mills; Silex and iron lined Tube Mills, etc.

Send for Bulletin No. 15.

CONSOLIDATED PRODUCTS COMPANY, INC.

17-19 PARK ROW
NEW YORK CITY
Shops and Yards at
Newark, N. J., cover six acres

Tel. Barclay 7-0600
WE WILL BUY YOUR SURPLUS MACHINERY

MOTORS—3 PH., 60 CY.

Hp.	Type	Speed
800	G. E. sl. rg.	720
600	G. E. syn.	860
2–600	G. E. sl. rg.	252
600	G. E. syn.	257
600	Al. Ch. syn.	240
3–675	Al. Ch. syn.	900
400	West. sl. rg.	514
400	Al. Ch. syn.	300
300	Al. Ch. sl. rg.	585
260	Al. Ch. syn.	720
250	West. sl. rg.	720
200	G. E. sl. rg.	1200
200	West. sl. rg.	500
200	F. M. sl. rg.	600
150	G. E. sl. rg.	1750
150	G. E. sq. c.	1750
100	Cr. Wh. syn.	225

ENGINE GENER.
1–400 kva., Cr. Wh., 240 v., 3 ph., 60 cy., 120 r.p.m. to Hamilton Corliss Engine.

MOTOR GENER.
1–750 kw. G. E. MPC., 250 v., D.C. Gener. to 1100 hp. G. E., ATI, synch. motor, 2200-3-60-900 r.p.m.

CENTRIF. PUMPS
3–14,000 G.P.M., 150′ Head dir. conn., 675 hp. Al. Ch. 900 r.p.m. syn. motors.
1–14,000 G.P.M., 60′ Hd., dir. conn. 260 hp., Al. Ch. 720 r.p.m.

Above are a few of our stock items.

BELYEA CO., INC.
153 W. 18TH ST., NEW YORK CITY
REBUILT GUARANTEED

Liquidation Bargains

(1) 200 H.P. Fairbanks-Morse type Y, style VA. Used three seasons. Bought new 1926—first class condition. $2500.00 without starting equipment.

(3) 3 ft. x 6 ft. Leahy Vibrating Screens, double deck. Latest type. One brand new. $1200.00.

(1) No. 6 Williams Hammermill. Good. $600.00.

(12) 1½ yd. v-shaped Kopel cars, 24″ g. Good. $21.00 each. Also locomotives and 36″ g. equipment.

(1) 120 H.P. WkS Waukesha Power Unit. Used only a few months. Guaranteed as good as new. $900.00.

(1) Heavy Duty Clyde Double Drum Hoist, 40 H.P. Waukesha Gasoline Engine. Used thirty days. Good as new. Original price $1925.00. Sell for $800.00.

(1) 310 cu. ft. I.R. Portable Compressor. Used three months on one job. Guaranteed good as new. $1000.00.

(1) ½ yd. Insley Gas. Cat. Shovel. Used thirty days. $1750.00. Also larger shovels, caterpillar tractors, etc.

M. WENZEL
229 Southwest Boulevard, Kansas City, Mo.

BARGAINS

Special	Extra

5—21-ton 11x16″ Vulcan 36″ gauge 4-wheel saddle tank locomotives, Code boilers, built 1923.

2—21-ton 11x16″ Porter 36″ gauge 4-wheel saddle tank locomotives, Code boilers, built 1921.

1—21-ton 11x16″ American 36″ gauge 4-wheel saddle tank locomotive, Code boiler, built 1922.

75—4-yard WESTERN 36″ gauge steel underframe 2-way side dump cars, box-door type.

All purchased recent Court Sale at Edgefield, South Carolina. Immediate shipment. Thoroughly rebuilt since last used.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
P. O. Box 391
BIRMINGHAM, ALABAMA

SPECIALS FOR SALE

1—12′ Gayco Separator, Model 21.
3—Hardinge Mills, 4½′x16″, 5′x22″, 8′x30″.
1—Allis-Chalmers No. 2 Pulverator, 20″x12′.
2—Allis-Chalmers 10x7″, 24x12″ late type Jaw Crushers.
2—Sturtevant No. 1, No. 1½ Rotary Fine Crushers.
1—Sturtevant No. 1 Ring Roll Mill.
2—Raymond five roll, low side Mills.
6—No. 0000, No. 00, No. 1 Raymond Mills.
1—Tyler Hammer, type 31, double unit Screen.

STEIN-BRILL CORPORATION
183 Varick St., New York City, N. Y.

For Sale

10—15 HP FOOS gasoline engines

10—15 HP Galloway & Bulldog horizontal engines
Each $50.00

50—Steel Skip Loaders 15 to 20-ton capacity steelhoppers complete with hoists and cable but no power. Very reasonable.

20—O & S Double Drum belt driven Skip Hoists

20—McGee & Scully Double Drum Skip Hoists

Very Reasonable

THE W. T. WALSH EQUIPMENT CO.
12500 Berea Road Cleveland, Ohio

FOR SALE

JAW CRUSHERS—4″x8″-7″x11″-8″x14″-9″x15″-10″x16″-6″x20″ - 11″x22″ - 12″x24″ - 13″x30″ - 15″x30″ - 18″x30″-18″x36″ - 20″x50″ - 28″x36″ - 30″x30″ - 26″x42″ - 36″x48″-42″x60″-42″x48″.

Crushing Rolls—16″x10″ up to 54″x64″.

Gyratory Crushers—From No. 3 up to 42″.

No. 0-No. 1 and No. 1½ ring roll mill.

No. 0-No. 1 and No. 1½ rotary fine crushers.

Swing hammer mills.

3′x25′-4′x30′-5′x30′-5½′x40′ direct heat rotary dryers.

4′x30′-4½′x26′-5′x30′-5½′x30′ semi-indirect heat rotary dryers.

Indirect heat and steam heated air rotary dryers.

Rotary cement kilns from 3′ to 9′ diameter.

Hardinge-Marcy and Fuller-Lehigh mills.

No. 0000-No. 000-No. 00-No. 0-No. 1—3 roll and 5 roll. Raymond mills.

One 6′x8′ Traylor ball mill.

5′x12′ and 4′x10′ rod mills.

Tube mills from 4′ to 7′ in diameter.

8′-10′ and 12′ air separators.

Hummer-Sturtevant-Gyrex and Niagara screens.

Hoist—air compressors—pressure blowers.

W. P. HEINEKEN, Engineer
Chrysler Bldg., New York Tel.—Van. 3-1566

For Sale

1—No. 7⅛ McCully Crusher.
1—No. 6 Smith Crusher.
1—No. 5 Austin Crusher.
1—10″ Superior McCully Crusher.
1—8″ Traylor Crusher.
2—No. 3 Gates Crushers.
1—6″ Superior McCully Reduction Crusher.
1—48″ Symons Horizontal Disc Crusher.
Several Jaw Crushers.
Gas and Electric Motors, 1 HP to 200 HP.
1—Clipper Well Drill.
1—Clyde 2 Drum Hoist, built for 2 Yd. Drag Scraper, with or without motor.
2—Complete Gravel Washing Plants.

LIPPMANN ENGINEERING WORKS
4603 W. Mitchell St. Milwaukee, Wis.

5-YD. CAPACITY
ELECTRIC DRAG SCRAPER HOIST

GOOD AS NEW
A. C. or D. C. OPERATION

Also a Large Stock of Used

Electric–Gasoline–Steam Hoists in Excellent Condition

FOR PRICES AND SPECIFICATIONS WRITE

LIDGERWOOD MFG. COMPANY
ELIZABETH, NEW JERSEY

SPECIAL OFFERING

RUBBER CONVEYOR BELTING

New—Guaranteed—First Grade

540 FEET—	14″x7 PLY—	1/4″	TOP COVER
530 FEET—	20″x5 PLY—	1/8″	TOP COVER
239 FEET—	20″x6 PLY—	3/16″	TOP COVER
125 FEET—	36″x4 PLY—	1/32″	TOP COVER

EXCEPTIONAL LOW PRICES

WILL CUT ANY LENGTHS DESIRED

(Other Sizes on Hand)

Carlye Rubber Co.
Transmission and Conveyor Belting
64 Park Place New York City

FOR SALE

Erie ¾ Yd. Steam Shovel on Cats.
8 Ton Plymouth Std. Ga. Gas Locomotive.
5 Ton 48″ Ga. Plymouth Gas Locomotive.
19 Easton 4 Yd. End Dump 48″ Ga. Quarry Cars.
5″ High Pressure Pump.
30 & 60 Caterpillar Tractors.
19 K & J 16 Yd. Std. Ga. Air Dump Cars.
2 Late Type Jordan Air Operated Spreaders.
1 Std. Ga. Nordberg Track Shifter.
175 Bucyrus Shovel, 5 Yd. Dipper.
856′ Sullivan Ang. Cpd. Air Compressor with 152 Hp. 220 V. A.C. Motor Belted.
Derricks, Boilers, Engines, Locomotives, Gravel Plants, Road Rollers, Forms, Finishers, Oil Engines, Motors.
TELL US WHAT YOU WANT TO BUY.

The T. J. Lane Company
Springfield, Ohio

Brand—New—Wire—Rope—For—Sale
At—Below—Market—Prices—Suitable—for—Hoisting—Guys—Draglines—Cableways—Dredges—Shovels—and—Etc.
All — Sizes — from—9/16″ to 2¼″—Dia. Inclusive—Priced—Right—for—Immediate—Sale—Send — for Complete—List—

TERRENCE P. WYNN
100 West 72nd St. New York City
Phone—Trafalgar—7-0536

Royal E. Burnham

Attorney at Law

•

Patent and Trade-Mark Causes

•

511 Eleventh Street, N. W.
WASHINGTON, D. C.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.
FORT WAYNE, IND.

AIR COMPRESSORS

4 ea. 12 x 10" Chicago Pneu. NSB 360 C.F. 100# press with 75 H.P. 3 ph. 60 cy. 220/440 V. Gen. El. 865 RPM KT-352 motors, starters belt idlers and endless leather belts—complete units—New 1929 used approx. one year.

Apply for price and particulars

JOHN D. CRAWBUCK CO.
Empire Bldg. Pittsburgh, Pa.

1—17 kw. 125 v. D.C. steam Engine Generator Set.
4—50 kva. Ridgway 220 v. A.C. steam Engine Generator Sets.
1—Broderick Bascom Co. Aerial Tramway 1162' long.
1—14 ton Plymouth Gasoline Locomotive standard gauge.
1—3 ton Plymouth Gasoline Locomotive 36" gauge.
1—4 ton Plymouth Gasoline Locomotive 36" gauge.
2—¾ cu.yd. Erie Shovels complete.

Duquesne Electric & Mfg. Co., Pittsburgh, Pa.

RELIABLE USED EQUIPMENT

All Sizes Diesel and Steam Engines, Generators, Crushers, Compressors, Hoist, Derricks, Cranes, Locomotives, Cars, Track Scales.
60 Hp. American 3-Drum and Swinger Gaso. Hoist.
50, 80, 100 Hp. 2 and 3-drum Electric Hoists.
100 Hp. Atlas Imperial Diesel Engine.
150 Hp. Allis-Chalmers, 900 rpm, Slip Ring Motor.

Send All Inquiries and Offerings to
MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St. St. Louis, Mo.
We can furnish what you need.

DIAMOND CORE DRILLING

CONTRACTORS
FIRECLAY, ASPHALT, LIMESTONE, COAL AND ALL MINERALS
Light Gasoline Outfits

MOTT CORE DRILLING COMPANY
HUNTINGTON, W. VA.

For Sale or Rent

5 to 30-yd. Side Dump Cars.
50-ton Std. Gauge Locomotives.
1-yd. Link-Belt Cranes and Draglines.
1-yd. Northwest Shovel-Draglines.
Also general construction equipment.

CLAPP, RILEY & HALL EQUIPMENT CO.
Chicago Pittsburgh
16 No. Clinton St. Union Trust Bldg.

FOR SALE

1—P&H Shovel—Model 700—1¼ yd.
2—P&H Model 600—1 yd. with Shovel & Crane Attach.
1—P&H Crane—Model 206 with 40-ft. Boom.

R. B. WING & SON
384 Broadway, Albany, N. Y.

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc. Fire Clay. Coal, and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

FOR SALE

1—1030 Champion Roller Bearing Reduction Crusher
1—No. 6 Champion 12x26 Jaw Crusher
2—⅝ Yd. Thew Gas. Cat. Shovels

JOHNSON AND HOEHLER, Inc.
Lansdowne, Penna.

SPECIALS FOR THIS MONTH

10—20KVA, 60 cycle, 3 phase, 220/440 volt, 1800 RPM, Generators.

Wire, write or phone.

Erie Electric Motor Repair Co., Inc.
126 Church Street, Buffalo, N. Y.

SWEDISH HOLLOW DRILL STEEL GUARANTEED 100% PERFECT

Considerably below market prices.
20 ton ⅞-in. Hexagon.
50 ton ⅞-in., 1-in., 1⅛-in., 1¼-in., and 1⅜-in. Round, Hexagon and Quarter Octagon.

MARINE METAL & SUPPLY CO.
167 South St. New York City

MISCELLANEOUS BARGAINS

Monighan Diesel Draglines, 4 yd., with 150' booms.
Crushers and Plants—8x36 with 22x18 rolls, 9x36, 9x24, and 9x36 plant without crusher. 14x36–15x24–9x16, etc.
75 H. P. Drag Scraper outfit, barg. Buckets ½ to 6 yds.
Drag Scrapers—2—1½—1—¾ and ½ yd. Elec., belted and gas.
Sand Pumps—6", 8", 10" and 12", 25' and 35' cutters and ladders.
13" and 12" pipe. 2—8"x20' NEW suction hose.
Diesel Engines and Generator Units—From 6 to 1200 H.P.
Bridge Crane—300' bucket travel, 5 ton, AC 3-60-220.

JAMES WOOD, 53 West Jackson Blvd., Chicago, Ill.

WANTED

Superintendent for Silica Sand plant. Permanent connection. Must be familiar with maintenance and operation of steam shovels, jaw, roll crushing and screen equipment. Under forty years old. In reply give complete history, previous connections and references. Address Box 705, Pit and Quarry Publications, 538 S. Clark St., Chicago, Ill.

PIT AND QUARRY

Research Department

538 South Clark St., Chicago, Ill.

Please send me catalogs and prices concerning the following items checked below:

- ☐Agitators, sand and Gravel
- ☐Agitators, Slurry
- ☐Air cleaners
- ☐Air compressors
- ☐Bag filling and weighing machinery
- ☐Bags, cloth
- ☐Bags, paper
- ☐Balls, steel
- ☐Barges, steel
- ☐Belt dressing
- ☐Belt fasteners
- ☐Belting, conveyor and elevator
- ☐Belting, transmission
- ☐Belt lacing
- ☐Belt plates
- ☐Belt rivets
- ☐Belt tighteners
- ☐Bin gates
- ☐Bins, concrete
- ☐Bins, steel
- ☐Blasting supplies
- ☐Blasting powder
- ☐Blocks, friction
- ☐Boots, self-unloading
- ☐Bodies, Motor Trucks
- ☐Brake Linings
- ☐Buckets, Clamshell
- ☐Buckets, Conveyor and Elevator
- ☐Buckets, Dragline
- ☐Buckets, Orange Peel
- ☐Cableways, Slackline
- ☐Calcining Machinery
- ☐Car Dumpers
- ☐Car Pullers and Movers
- ☐Carriers, Belt
- ☐Cars, Dump
- ☐Cars, Kiln
- ☐Castings, Manganese Steel
- ☐Castings, Steel
- ☐Chains, Conveyor and Elevator
- ☐Chains, Power Shovel, Crane and Dredge
- ☐Chains, Transmission
- ☐Chutes
- ☐Classifiers
- ☐Clips, Wire Rope
- ☐Clutches
- ☐Clutches, Magnetic
- ☐Concrete Plants, Ready Mixed
- ☐Cones, Washing
- ☐Conveyors, Apron
- ☐Conveyors, Belt
- ☐Conveyors, Pneumatic
- ☐Conveyors, Screw
- ☐Conveyors, Skip
- ☐Coolers
- ☐Couplings, Flexible
- ☐Couplings, Hose
- ☐Cranes, Locomotive
- ☐Cranes, Overhead Traveling
- ☐Cranes, Truck
- ☐Crushers, Cone
- ☐Crushers, Disc
- ☐Crushers, Gyratory
- ☐Crushers, Hammer
- ☐Crushers, Jaw
- ☐Crushers, Ring
- ☐Crushers, Roll
- ☐Crushers, Rotary
- ☐Cutter Heads, Dredging
- ☐Derricks
- ☐Draglines, Cableway
- ☐Draglines, Revolving Boom
- ☐Dredges, Dipper
- ☐Dredges, Hydraulic
- ☐Dredges, Ladder
- ☐Drill Sharpening Machinery
- ☐Drills, blast hole
- ☐Drills, Diamond Core
- ☐Drills, Hand Hammer
- ☐Dryers, Rotary
- ☐Dryers, Sand and Gravel
- ☐Dust Collecting Systems
- ☐Dynamite
- ☐Elevators, Bucket
- ☐Engines, Diesel
- ☐Engines, Gas
- ☐Engines, Gasoline
- ☐Engines, Hoisting
- ☐Engines, Oil
- ☐Feeders
- ☐Filters, Air
- ☐Filters, Oil
- ☐Fire Brick
- ☐Flanges, Pipe
- ☐Frogs and Switches
- ☐Fuses, Blasting
- ☐Gears
- ☐Goggles
- ☐Governors
- ☐Grinding Balls
- ☐Grizzlies
- ☐Guns, Hydraulic
- ☐Hoists, Air
- ☐Hoists, Derrick
- ☐Hoists, Drum
- ☐Hoists, Motor Truck Body
- ☐Hoists, Skip
- ☐Hose, Air Steam, Water
- ☐Hose, Sand Suction
- ☐Hydrators
- ☐Kettles, Calcining
- ☐Kilns, Rotary
- ☐Kilns, Vertical
- ☐Linings, Kiln
- ☐Loaders, Portable
- ☐Loaders and Unloaders, Box Car
- ☐Locomotives, Diesel
- ☐Locomotives, Gasoline
- ☐Locomotives, Steam
- ☐Log Washers
- ☐Measuring Devices
- ☐Mills, Compartment
- ☐Mills, Tube
- ☐Mixers, Plaster
- ☐Motors, Electric
- ☐Motors, Gasoline
- ☐Motor Trucks
- ☐Motor Trucks, Ready Mixed Concret
- ☐Nozzles, Hydraulic Mining
- ☐Nozzles, Gravel Washing
- ☐Nozzles, Spray
- ☐Nozzles, Dust Settling
- ☐Nozzles, Suction Hose
- ☐Nuggets, Grinding
- ☐Perforated Metal
- ☐Poidometers
- ☐Pulleys, Clutch
- ☐Pulleys, Magnetic
- ☐Pulverized Fuel Systems
- ☐Pulverizers, Ball, Conical, Pebble
- ☐Pulverizers, Disc
- ☐Pulverizers, Hammer
- ☐Pulverizers, Ring
- ☐Pulverizers, Rod
- ☐Pulverizers, Roll
- ☐Pumps, Centrifugal
- ☐Pumps, Deep Well
- ☐Pumps, Sand and Gravel
- ☐Pumps, Slurry
- ☐Pumps, Steam
- ☐Radiators, Engine Cooling
- ☐Rails
- ☐Refractories
- ☐Respirators
- ☐Rollers, Conveyor
- ☐Rolls, Crushing
- ☐Rope, Wire
- ☐Safety Appliances
- ☐Sand-Lime-Brick Machinery
- ☐Scales, Track
- ☐Scales, Truck
- ☐Scrapers, Dragline
- ☐Screens, Revolving
- ☐Screens, Shaking
- ☐Screens, Vibrating
- ☐Separators, Air
- ☐Separators, Dry Centrifugal
- ☐Separators, Magnetic
- ☐Shovels, Gasoline
- ☐Shovels, Steam
- ☐Skips
- ☐Sleeves, Dredge
- ☐Slugs and Nuggets, Grinding
- ☐Speed Reducers and Gears
- ☐Spray Nozzles
- ☐Sprays, Paint
- ☐Sprockets
- ☐Steel, Tool
- ☐Stokers
- ☐Switches, Track
- ☐Tanks, Concrete and Steel
- ☐Tanks, Sand Settling
- ☐Tanks, Wood
- ☐Thickeners, Slurry
- ☐Track, Portable
- ☐Track Shifters
- ☐Tractors, Crawler
- ☐Tramways, Aerial
- ☐Trippers, Belt
- ☐Trippers, Tramway
- ☐Unloaders
- ☐Valves, Pump
- ☐Washers and Scrubbers, Sand, Gravel, Stone
- ☐Weighters, Automatic
- ☐Welding Supplies
- ☐Wheels, Car
- ☐Winches
- ☐Wire Cloth
- ☐Wire Cloth, Manganese Steel

To be used for.....

Firm Name..... *Individual*.....

Address..... *City*..... *State*.....

"E.C.A." REBUILT EQUIPMENT—IMMEDIATE SHIPMENT

AIR COMPRESSORS
Portable and stationary, belt, with elec. or gas, power, sizes from 21 cu.ft. to 1000 cu.ft.

BUCKETS
246—Buckets, all sizes and makes.

CARS
Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.
70—Quarry cars; 22-36-in. ga. 2-yd. end dump; 48—42-in. ga. 2½-yd. one-way side dump.

CONVEYORS and ELEVATORS
2000 ft. 36 in. 7 ply rubber covered conveyor belt.
9—Portable Belt Conveyors with steel frame, gas or electric power, 18 in. and 24 in. Barber Greene and Chicago Automatic.

CRANES (Locomotive)
5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.

CRANES and DRAGLINES
2—2-yd. Diesel draglines; 1—Link Belt Crawler. K-55, 70 ft. boom; 1—Page-Walker 65 ft. boom.
1—Northwest Type M, Serial No. 2334, 60-ft. boom, 1½-yd. dragline or clamshell bucket.

SPECIAL OFFER

CRUSHERS
1—20 in. Traylor Bulldog Gyratory crusher, SU No. 14277; size of each opening, 20 in. x 80 in.; weight 104,000 lbs.; cap. 250 tons per hour of 4" material, 110 tons per hour of 2½" material; used only short time.
1—Symons coarse cone crusher, size No. 5½, SU No. 521; capacity 450 tons per hour of 2½" material—130 tons per hour of ½" material; weight 85,000 lbs.
1—Set Power and Mining Machinery Co. crushing rolls, size 42 in. x 16 in., rated capacity 15-20 tons per hour of ⅜" material; weight 41,000 lbs.
1—No. 6 Champion jaw crusher, No. U-1075-4; jaw opening 12"x26"; capacity 24-35 tons per hour of 2" material; weight 20,000 lbs. Like new.
2—No. 3 McCulley gyratory crushers; size of each opening 7"x28"; capacity 25 tons per hour of 2¾" material; 11 tons per hour of 1¼" material; weight 17,000 lbs.

SCREENS
2—Allis Chalmers roller type, all steel, heavy duty, 48 in. dia. by 24 ft. long screen in 3 sections.
2—P & M Roller type, 48 in. by 18 ft. long.
1—Allis Chalmers, roller type 51" dia. by 21 ft. long.
6—Universal vibrating screens, 3 ft. wide by 8 ft. long.
6—1-yd. gasoline crawler type cranes, Northwest, Link Belt, P & H, Brownhoist.
3—½-yd. gasoline crawler cranes, Bucyrus Erie, Northwest and Brownhoist.

DERRICKS
Steel and wood, stiff leg, or guy; from 5 to 50 tons.

HOISTS
Gasoline, electric and steam. All sizes.

LOCOMOTIVES
32—Gasoline locomotives from 14-ton to 2-ton, std. 36 and 24-ga.
2—Steam Porter Saddle Tanks 1—cyl. 14-22, 40-ton, Serial No. 6880; 1—cyl. 16x24, 50-ton, Serial No. 7035.

PUMPS
All sizes and types, both force, centrifugal and steam.

SHOVELS
15—St'm and Gas., including 3—50B Bucyrus Nos. 10311, 9857, 9856; 2 Osgood 1½ yd. Nos. 1576 and 1575; 1—Bucyrus 50-B 1¼ yd., No. 3910 and 3—Northwests 2—1 yd., Nos. 2335, 3030, and 1—½ yd. No. 2538.

Equipment Corporation of America

PHILADELPHIA	CHICAGO	PITTSBURGH
P. O. Box 5419, Kingsessing Sta.	1160 S. Washtenaw Ave.	P. O. Box 933
Phone Granite 7600	Phone Nevada 2400	Phone Federal 2000

DERRICK OUTFIT

1—15-ton Steel Stiff Leg Derrick, 80-ft. boom, 38-ft. mast—in A-1 condition.

LOCOMOTIVE CRANES

3—25-ton American 8-wheel cranes, 50-ft. boom; new in 1930.

CARS

12-yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo. — 101 West 31st St. New York

---

BARGAINS ! ! !

Erie Type B Steam Shovel on Wheels with new boom and dipper. Or sell any part.
Orton ½ yd. Crane with Owen Bucket, 30 foot boom and 17 foot extension.
Osgood Steam Crawler Crane with 35 foot boom and ¾ yd. Owen Bucket.
Byers-Massilon 1 yd. crawler steam shovel.
Byers Bull Dog full circle crane, 30 foot boom and ½ yd. Owen Bucket.
Byers Bear Cat with 30 foot boom and ½ yd. Owen Bucket.
Mack Bull Dog Tractor with Rogers 15 ton goose neck trailer and Rogers 40 ton goose neck trailer.
Osgood Gas Crawler Crane with 40 foot boom and 1 yd. Owen Bucket.
Lima 101 one and ¼ yd. Shovel.
Buckeye Gas Trench Digger.

J. FRANK ROLLINGS
2215 West Boulevard — Cleveland, Ohio

SACRIFICE!!

Must Sell Immediately

Practically New

No. 7—20-TON AUSTIN HEAVY DUTY DRAGLINE CATERPILLAR CRANE

Exceptional machine for sand-pit, quarry or coal service.

Immediate delivery
Cash or Terms

Address Box 700, Pit and Quarry Publications, 538 S. Clark St., Chicago, Ill.

WANTED

One second hand 35 ton 60 ft. boom Industrial Brownhoist Locomotive Crane (8 wheel) must be good condition and good price. Should be in or near the South. Address Box 710, Pit and Quarry Publications, 538 S. Clark St., Chicago.

FOR SALE Osgood Shovel

1¼ yard Heavy Duty Gas Shovel in fine working condition. $1500 just spent in reconditioning. Must dispose of at sacrifice—$4100 cash. **Address Box 715, Pit and Quarry Publications, 538 S. Clark St., Chicago.**

FOR SALE

Farrell Jaw Crusher, type B, 18x36.
Reliance Jaw Crusher, type B, 8x14.
Double Deck Vibrating Screen, 4x6.
Trough Belt Conveyors 20" wide up to 250' long.
Trough Belt Conveyors 26" wide up to 400' long.
Used Conveyor Belt, 12 to 36" wide.
Trough Idlers, head and take-up pulleys, return idlers.
Elevator Belt 32" wide, 12 ply, 170'.
Hoists, Pumps, Locomotives, Cars and Rails.
G. A. UNVERZAGT, 15 Park Row, New York City

FOR SALE

1—36x42 Buchanan Jaw Crusher with electric motors.
1—36" Telsmith Cone Crusher with electric motors.
1—601 Koehring 1½-yard shovel.
2—30-ton Plymouth standard gauge gasoline locomotives.
20—20-yd. Western Standard gauge 2-way air dump cars.
D. C. ELPHINSTONE, Inc.
115 South Calvert Street — Baltimore, Md.
Telephone Calvert 0020

FOR SALE

Lime plant and property in Ste. Genevieve County, Missouri, with R. R. switch and Mississippi River loading facilities and equipment. Ideal plant for high calcium chemical lime.

B. E. ROMBAUER, Brickley's, Mo.

FOR SALE

18 in. & 24 in. Symons Cone Crushers.
24"x24" Galena Double Rolls.
Industrial 15 ton DC Cat. Gas Crane.
4'x6' Niagara Double Deck Vibrating Screen.
60 HP ASME, 125 lb. Portable Boiler.
75 HP Clyde, 3 Drum Electric Hoist.
60 HP Beaumont 2 speed Electric Hoist.
21-E Koehring Cat. B & B Paver.
4½x6 Mundy Steam Swinging Engine.
24x36 Traylor Jaw Crusher.
18x36 Farrell Jaw Crusher.
16,000 gal. Cap. Asphalt Tank.
800 HP Winton Diesel Engine.
No. 34 and 50 Ingersoll-Rand Drill Sharpeners.
1300' Chicago Pneumatic OCE, Elec. Air Compressor.
Calyx I.R. Class WS Core Drill.

R. C. STANHOPE, INC.
875 Sixth Ave. — New York City

FOR SALE—SEASONABLE ITEMS

2 Bucyrus 100B 3-yd. cat. mtd. steam shovels.
3 Bucyrus 50B—1¾-yd. cat. mtd. Diesels.
100 Western 5-yd. 36" ga. hvy. duty dumps.
50 Western 30- and 12-yd. S/G hand and air.
1 Brown loco. crane 25-ton D/D R.R. type.
1 stone plant 18" gyr. no real estate.
1 aerial tramway 2,800 ft. American.
1 Ottumwa mine hoist 4,000' electric.

A. V. KONSBERG, 111 W. Jackson Blvd., Chicago

FOR SALE

2—National Double Drum Electric Hoists, fitted with General Electric 60 H.P., 220 volt, 60 cycle, 3 phase motors, controllers and resistance grids. Will sell very cheap to quick purchaser.

SAMLER MACHINERY & EQUIPMENT CO.
206 W. Pratt Street, Baltimore, Md.

CRUSHERS
Guaranteed Rebuilt

3' Symons Cone—Very good
15x38 Wheeling Roller Bearing
No. 5 Allis Chalmers Gyratory
9x36 Cedar Rapids Portable Plant.

CALIFORNIA EQUIPMENT COMPANY
4940 Santa Fe Ave. — Los Angeles, Cal.

2—25 ton Ohio Locomotive Cranes, 50' boom, A.S.M.E. boiler. One D.D. and one S.D.
1—Vulcan 40 ton Std. Ga. Saddle Tank Locomotive.
1—Baldwin 75 ton 6-wheel Switcher (Oil Burner).
1—Marion 1 yd. Steam Crane, 40' boom, on cats.
1—Browning ⅝ yd. shovel with 35' crane boom.
1—Keystone one yard Skimmer.
1—Universal 7½ ton Truck Crane.
1—Chgo. Pneu. gas driven 220' portable compressor.
1—Ingersoll-Rand 220' portable compressor.
1—Lambert 3 drum Gas Hoist with Swinger.
2—1 yd. Steubner bottom dump Concrete Buckets.
2—1 yd. Hayward Clamshell Buckets.
1—⅜ yd. Hayward Clamshell Bucket.
1—C. H. & E. Road Pump with gas motor.
1—Morris 8" Dredge Pump with 150 HP G.E. motor.
1—Morris 10" Cent. Pump 2250 GPM @ 130' head.
2—Hundinger 6" Cent. Pumps, gas, self-priming.
1—Goulds 12" Cent. Pump with 50 HP G.E. motor.
1—Thompson 6" self priming pump with Waukesha motor.
1—LaBour 4" self priming pump.
2—No. 7 McKiernan-Terry Hammers.
1—No. 5 McKiernan-Terry Hammer.
HARRY C. LEWIS, 156 Market St., Newark, N. J.

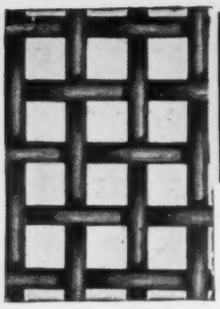
1—BYERS 1¼ yard Crane.
1—LORAIN 75 Shovel 1¼ yd.
1—1 yd. KOEHRING crane.
1—1 yd. P & H 600 Shovel.
2 and 3 yd. Electric draglines.
1—½ yard Gas dragline.
24" conveyors 75 and 170 ft.
4—4 yard Autocar trucks.
1—BROWNING Truckcrane.
2—30 CATERPILLAR Tractors with 5 yd. crawler wagons.
1—Perfect Classifier. 1—Shaw Classifier.
1—5x8 Vibrating Screen.
1—8 ton 36" gauge Locomotive.
Clamshell buckets ½ to 1¼ yd.
Crushers 10x18; 11x26; 18x30
Misc. Pumps for Gravel plant and Pipe.

J. T. WALSH
Brisbane Bldg. — Buffalo, N. Y.

FOR SALE

Marion Gas-Electric ¾ yard Shovel.
Osgood 1-yard gas crawler shovel, overhauled.
Locomotives: 75-ton switcher code boiler; also saddle tank type, narrow and standard gauge.
CARS: side dump 12-yard; 50-ton steel twin hopper cars, etc.

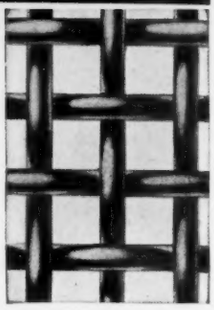
SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Ga.



National WIRE CLOTH

It Withstands Vibration Without Crystallization.
It Is Tough Enough to Resist Abrasion.
It Maintains Its Accuracy Thruout Life of Screen.
It Has Outworn All Other Special Alloy Cloths.

Immediate Shipments.....Attractive Prices



NATIONAL WIRE CLOTH CO.

FOOT OF BELLE STREET **ST. PAUL, MINN.**

Index to Advertisers

Allen-Sherman-Hoff Co. 64
*Allis-Chalmers Mfg. Co. 6
American Manganese Steel Co. 59
*American Steel & Wire Co. .. 9
Atlas Powder Co. 20

*Bartlett & Snow Co., C. O. .. 66
Binks Mfg. Co. 66
Birmingham Rail & Locomotive Co. 69
Broadcast Section.....69-71
Buffalo Wire Works Co. ... 64
Burnham, Royal E. 70

Catlin, A. W. 19
Chicago Perforating Co. 66
Consolidated Products Co. .. 69

*Deister Concentrator Co. ... 65
Deister Machine Co. 68
*Dixie Mchy. Mfg. Co. 61

*Eagle Iron Works..... 65
*Ensign-Bickford Co. 14
Equipment Corporation of America 71
Erie Pump & Engine Works. 66

Fuller Co. 13

Gay, Rubert M. 61
General Motors Truck Co... 1
Good Roads Machy. Corp.... .....Inside Back Cover
Goodyear Tire & Rubber Co. 3
*Gruendler Crusher & Pulv. Co. 68

Haiss Mfg. Co., Geo. 64
Heineken, W. P. 69
*Hendrick Mfg. Co. 65
Hetherington & Berner, Inc. 72

*Ingersoll-Rand Co. ....Inside Front Cover
Iowa Mfg. Co. 15

*Jeffrey Mfg. Co. 17

*Kennedy-Van Saun Mfg. & Engr. Corp. 63
Krupp-Grusonwerk 12

Lewistown Foundry and Machine Co. 66
*Link-Belt Co. 4-5

Manganese Steel Forge Co. . 11
Manitowoc Engr. Works.... 19
McLanahan and Stone Corp. 65
*Michigan Power Shovel Co.. 63
*Morris Machine Works..... 66
Morrow Mfg. Co. 68
Mott Core Drilling Co. 70

National Wire Cloth Co..... 72

Ohio Power Shovel Co. 7

Pennsylvania Drilling Co. .. 70
Pioneer Gravel Equip. Mfg. Co. .....Back Cover
Productive Equip. Corp..... .....Inside Back Cover
Pulmosan Safety Equipment Corp. 64

Raymond Bros. Impact Pulv. Co. 16

*Sauerman Bros. Inc. 64
*Smidth, F. L., & Co. Front Cover
Smith Engr. Works..... 8
Sprout, Waldron & Co. 66

*Universal Crusher Co. 65
Universal Road Machy. Co.. 61

Wenzel, M. 69
Williamsport Wire Rope Co. 10

***See also information in the 1933 Pit and Quarry HANDBOOK**

COMPLETE HYDRAULIC DREDGES

SAND AND GRAVEL DREDGING PUMPS
AGITATING MACHINERY
DREDGE HOISTS
STEEL HULLS • PONTOONS
PIPE LINE ACCESSORIES

HETHERINGTON & BERNER, INC.
701-745 KENTUCKY AVENUE -- -- -- -- INDIANAPOLIS, IND.

GOOD ROADS
MACHINERY CORPORATION

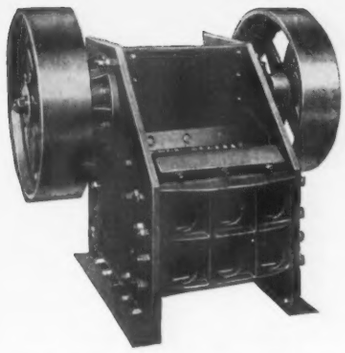
Investigate

Find out WHAT you are buying BEFORE you buy. To find out about it afterwards is costly and disappointing.

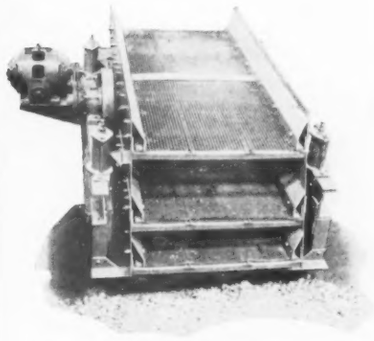
Good Roads equipment is time proven, yet it is modern, up to the minute and it will give you long, satisfactory service, with minimum first cost, lowest operating and maintenance costs.

GOOD ROADS
MACHINERY
CORPORATION

KENNETT SQUARE
PENNSYLVANIA



The Good Roads Champion Roller Bearing Crushers are the most outstanding overhead eccentric type jaw crushers in the field today. Good Roads insures you the ultimate goal—low cost per ton.



The Good Roads Champion Vibrating Screens are featured with a patented cylindrical assembly at each corner. Unusual smooth action—careful balance—screen section readily changed.

VARIABLE Circle-Throw

The Jigger tops all screens for grading efficiency — for it's the only screen with *controlled vibration*, adjustable to suit material. Every square inch of cloth is kept as busy as a top with *circle throw action* insuring higher recovery, closer grading, lower costs.

Self-Centering Stabilizers
Self-Aligning Housings
Soft Shoe Mountings
Oil Lubrication

PRODUCTIVE EQUIPMENT CORP., 210 East Ohio Street, Chicago, Illinois

1½ tons per minute

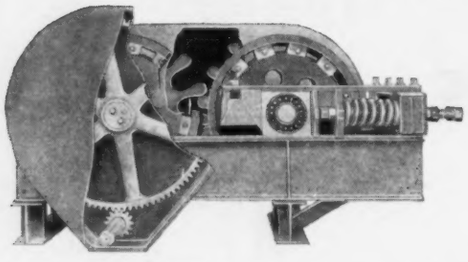
A PIONEER OF COURSE

PIONEER WILL DO YOUR JOB FASTER-CHEAPER-BETTER

PRODUCING SIMULTANEOUSLY 4 SIZES OF MATERIAL FROM LIMESTONE

Dust to No. 8—No. 8 to ⅝"—⅝" to 1½"—⅝" to 2"—returning rejects to crusher.

. . . . THERE IS A REASON WHY PIONEER GIVES THIS YARDAGE



The Pioneer 40"x20" Anti-Friction Bearing Roll Crusher. This 2" stage reduction crusher makes large capacities possible.

LET US

help you along the road to more substantial profits. We can assist you in getting a better and more economical crushing result. . . . We build rolls in four sizes.

THE Pioneer No. 245 Duplex Quarry Plant is a balanced unit plant, designed to give the maximum yardage. The Units in the plant above include; Pioneer 1536 Roller Bearing Jaw Crusher, Pioneer 40"x20" Anti-Friction Bearing Roll Crusher and 34-foot Bucket Elevator mounted on truck, a Pioneer No. 6 Shaker Screen with 40"x16' screen plates for sizing material mounted on two Pioneer 21-yard Bins with Partitions. A spout returns rejects to roll crusher for secondary crushing.

The above installation was shipped to LaCrosse County, Wisconsin, May 4th, 1934, and is in operation at Bangor.

PIONEER GRAVEL EQUIPMENT MFG. CO., MINNEAPOLIS